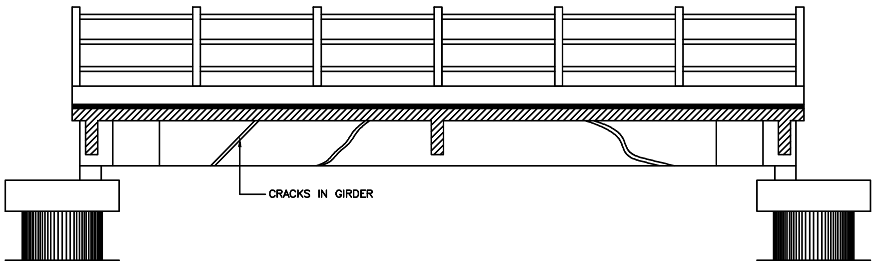
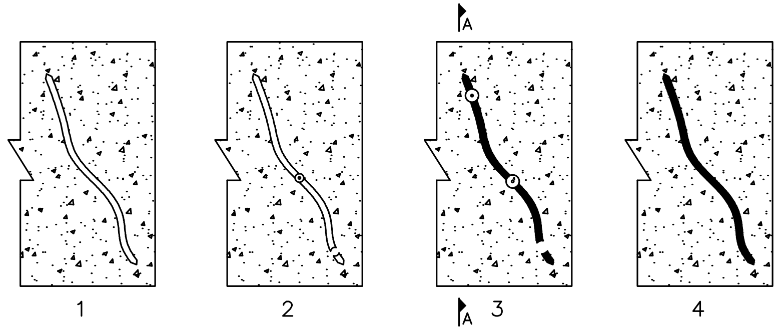
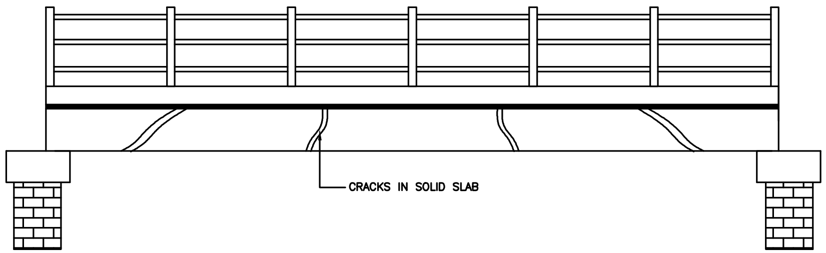


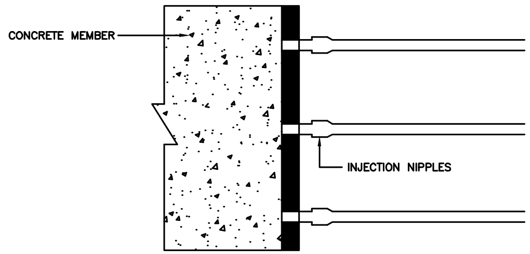
CRACKS IN GIRDER OF T–BEAM DECK SLAB



SEQUENCE OF OPERATION FOR SEALING OF CONCRETE CRACKS



CRACKS IN R.C.C. SOLID SLAB

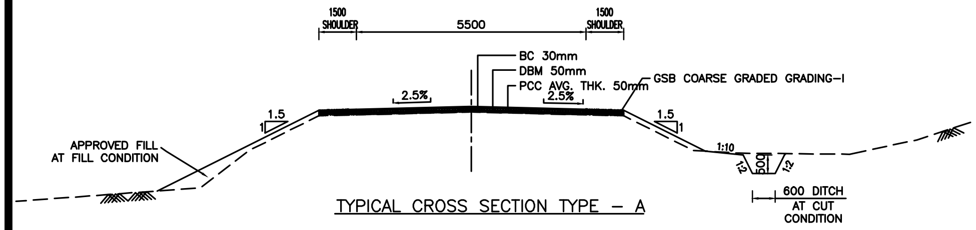


CROSS SECTION A–A OF CRACK MEMBER

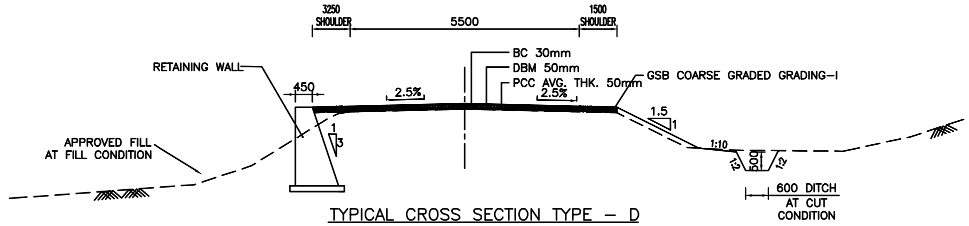
TYPICAL METHODOLOGY
(DETAILS AS PROVIDED IN TECHNICAL SPECIFICATIONS)

1. SURFACE ADJACENT TO CRACK AND AREA OF APPLICATION SHALL BE CLEANED OF DUST. DIRT. BREASE OIL, EFFLORESANCE AND OTHER FOREIGN MATERIAL BY BRUSHING/WATER JETTING OR SAND BLASTING.
2. PROVIDE ENTRY PORTS ALONG CRACK AT 300 MM C/C OR THICKNESS OF MEMBER WHICHEVER IS DRILLED HOLE 13 mm DIA AND 200 mm DEEP DEPTH SHALL NOT BE MORE THAN 60 % OF DEPTH OF MEMBER.
3. SEAL THE CRACKS WITH SURFACE SEAL MATERIAL BETWEEN ENTRY PORTS.
4. INJECT EPOXY ADHESIVE FROM LOWEST ENTRY PORT INJECT TILL ADHESIVE APPEAR AT THE NEXT ENTRY PORT.
5. REPEAT THE PROCESS OF INJECTING EPOXY FROM NEXT ENTRY PORT UNTIL THE CRACK ARE COMPLETELY FILLED.
6. IF PORT TO PORT TRAVEL OF EPOXY IS NOTICED OR THE VOLUME OF THE INJECTED MATERIAL EXCEED 2 LITER AT A PARTICULAR ENTRY PORT WORK SHALL BE STOPPED AND THE ENGINEER SHALL BE CONSULT.
7. SEALING OF CRACK BY INJECTION OF EPOXY SHALL BE CARRIED OUT AS PER MORTH SPECIFICATION 2803

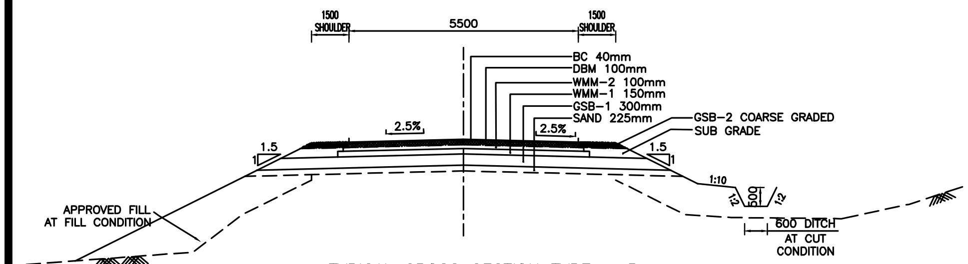
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



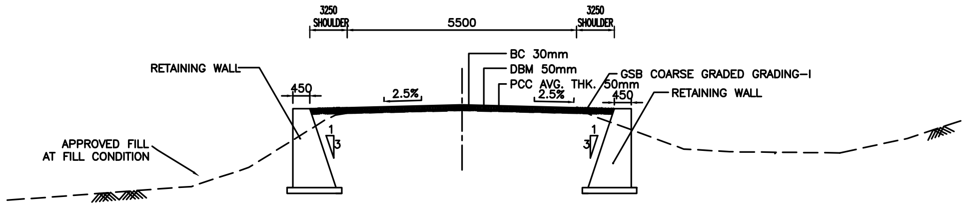
TYPICAL CROSS SECTION TYPE – A



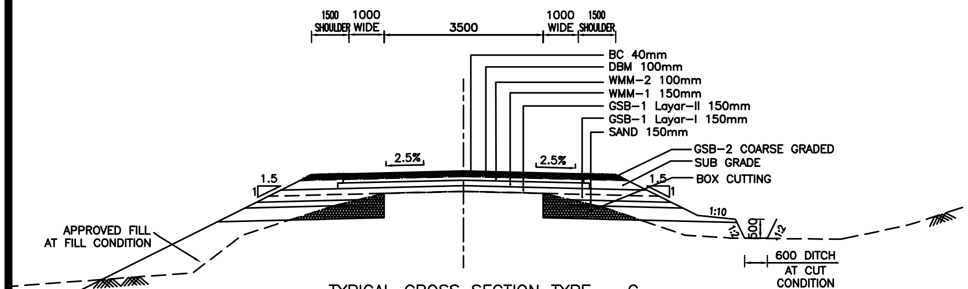
TYPICAL CROSS SECTION TYPE – D



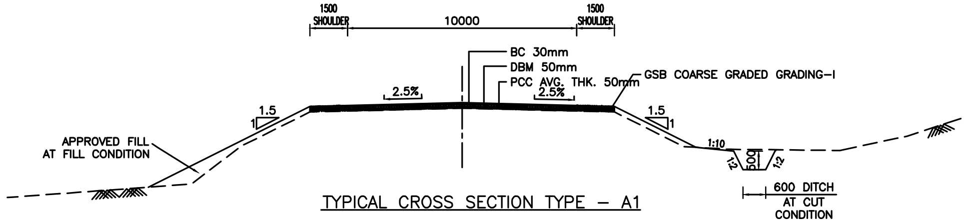
TYPICAL CROSS SECTION TYPE – B



TYPICAL CROSS SECTION TYPE – E



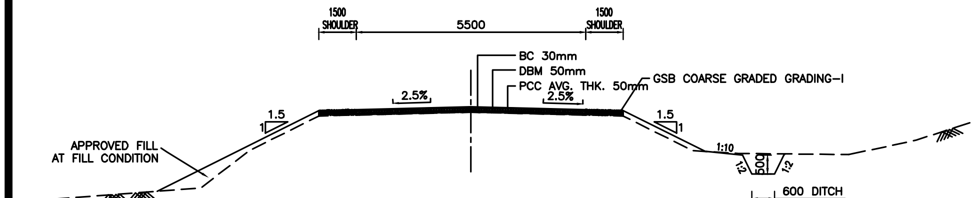
TYPICAL CROSS SECTION TYPE – C



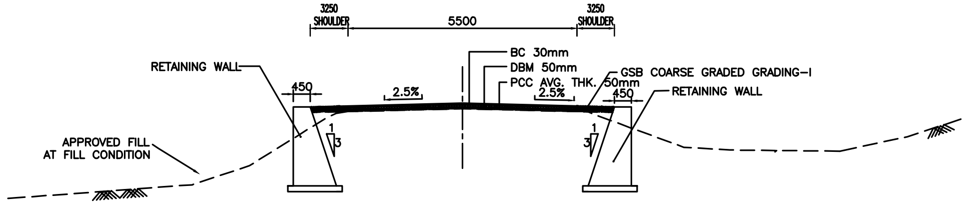
TYPICAL CROSS SECTION TYPE – A1

TYPICAL CROSS SECTION

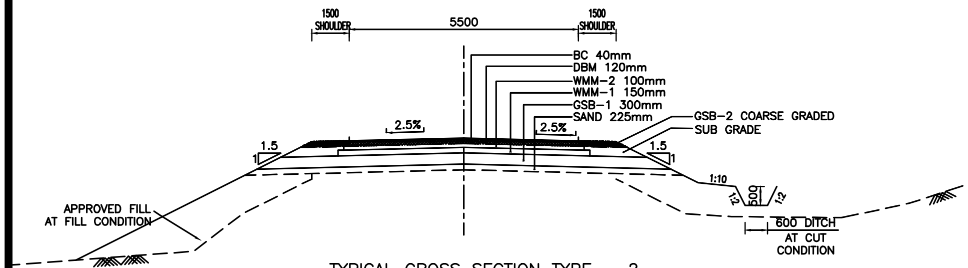
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



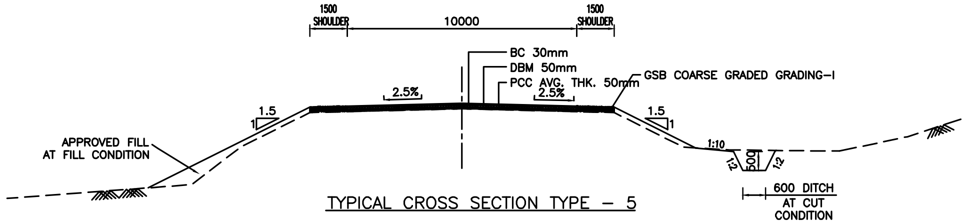
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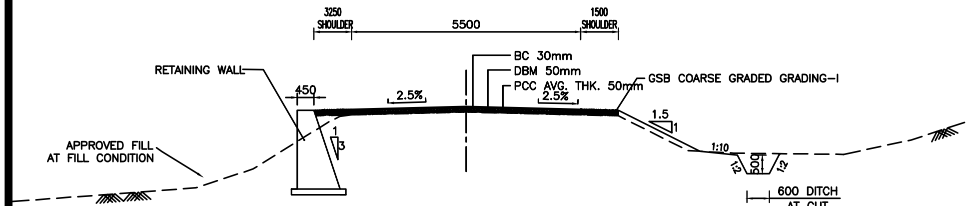
TYPICAL CROSS SECTION TYPE – 4



TYPICAL CROSS SECTION TYPE – 2



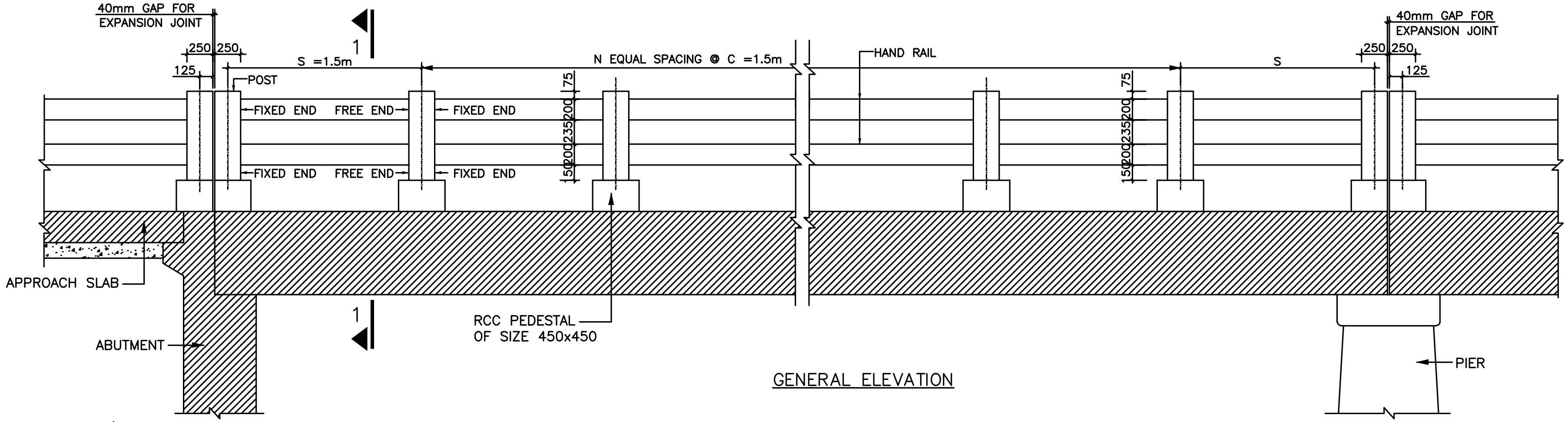
TYPICAL CROSS SECTION TYPE – 5



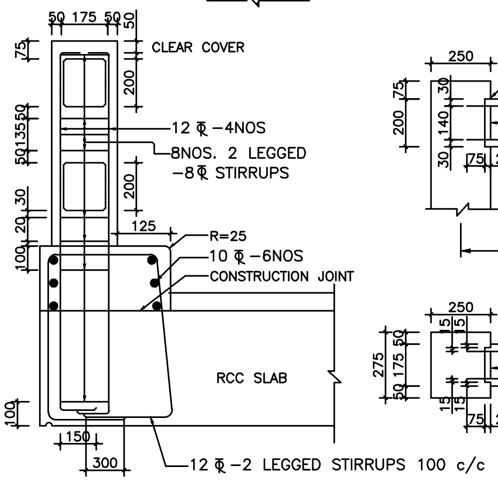
TYPICAL CROSS SECTION TYPE – 3

TYPICAL CROSS SECTION

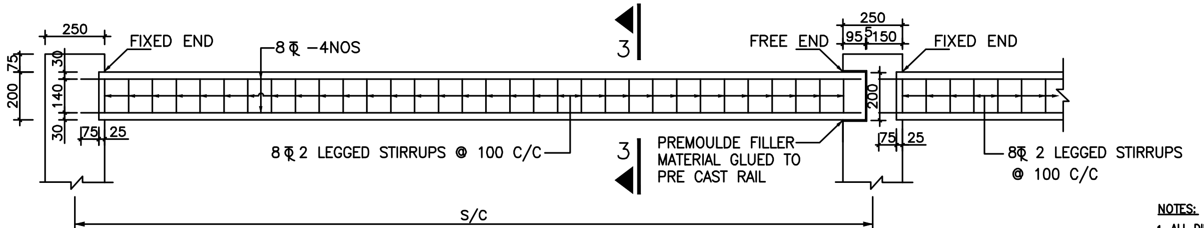
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



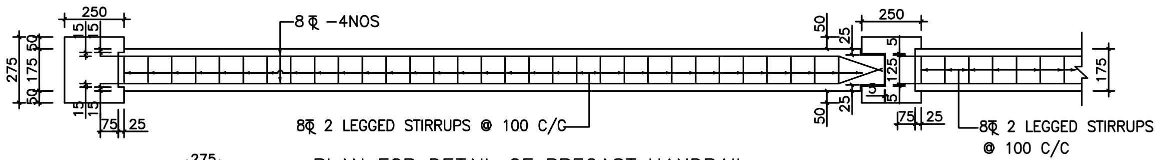
GENERAL ELEVATION



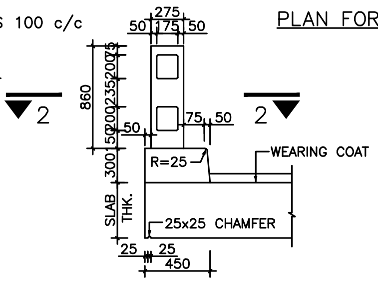
REINFORCEMENT DETAIL FOR SECTION 1-1



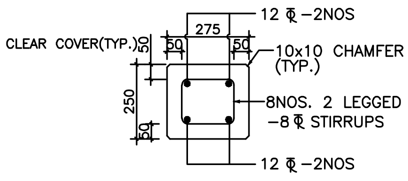
SECTIONAL ELEVATION



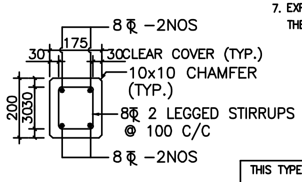
PLAN FOR DETAIL OF PRECAST HANDRAIL



SECTION 1-1



SECTION 2-2



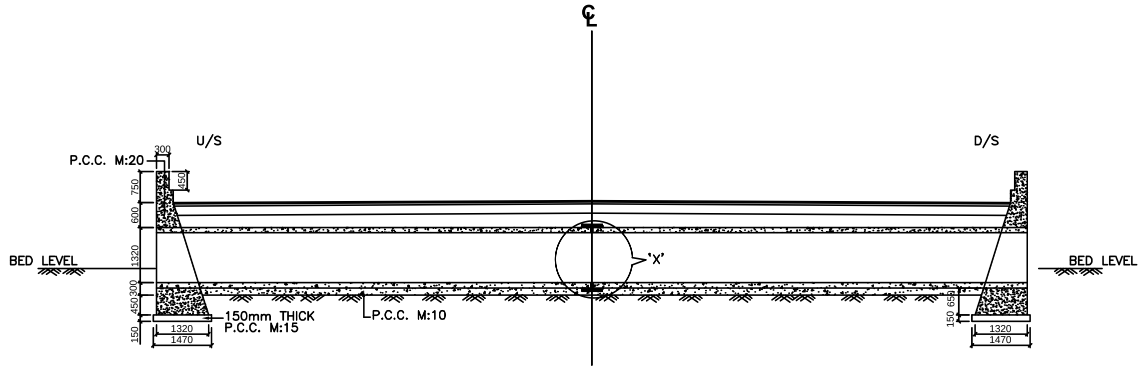
SECTION 3-3

NOTES:

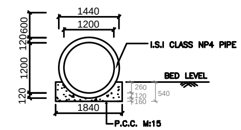
1. ALL DIMENSIONS ARE IN MM
2. CENTRE TO CENTR SPACING BETWEEN SUCCESSIVE VERTICAL POSTS SHOWN IN THE ELEVATION SHALL BE ADJUSTED TO SUIT THE LENGTH OF BRIDGE SPAN FOR WHICH THE RALING IS USED BUT IN NO CASE IT SHALL EXCEED 1870 mm.
3. REINFORCEMENT OF RAILING POST SHOULD BE SUITABLY ANCHORED IN DECK SLAB.
4. CASTING OF POST SHALL BE DONE IN SINGLE POUR AFTER ACCURATELY POSITIONING THE PRECAST HANDRAIL.
5. RAILING SHALL BE CONSTRUCTED ONLY AFTER THE STRUCTURAL CONCRETE OF SUPERSTRUCTURE HAS HARDENED AND SHUTTERING IS RELEASED.
6. IN CASE OTHER TYPE OF RAILING IS USED THE WEIGHT OF SAME ON EACH SIDE SHALL NOT EXCEED 3KN PER METRE
7. EXPANSION GAPS IN RAILING SHALL BE PROVIDED AT THE SAME LOCATIONS AS IN THE DECK SLAB.

THIS TYPE OF RAILING WILL BE USED AT BRIDGES IDENTIFIED TO BE REPAIRED WHERE THE METAL RAILING OR GUARD STONES HAVE ORIGINALLY BEEN PROVIDED IN FULL OR PARTIAL LENGTH OF BRIDGE. REFER NOTE 27 OF GENERAL NOTES

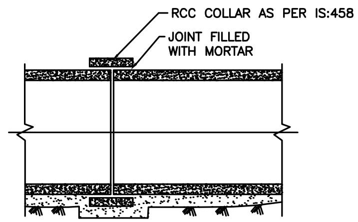
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



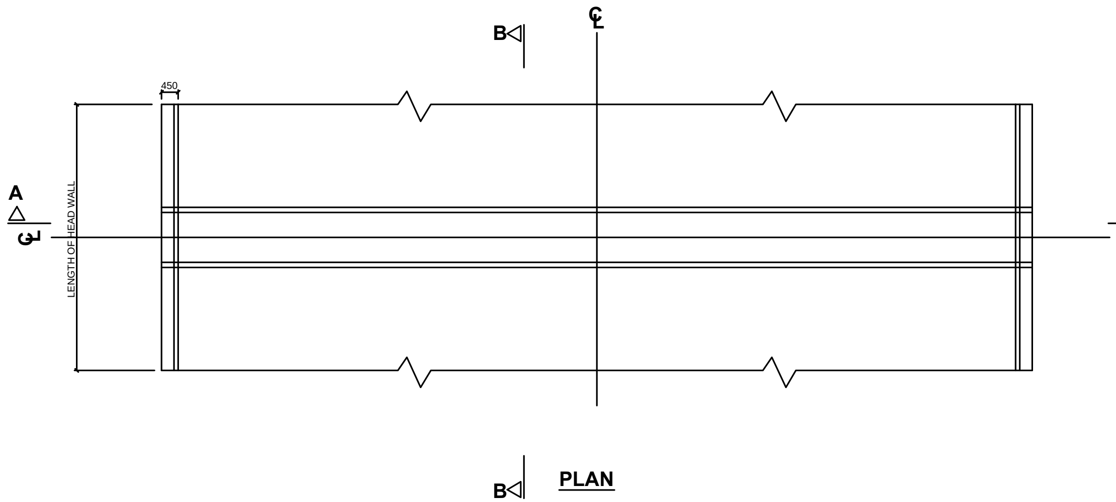
SECTION A-A



SECTION B-B



DETAILS OF 'X'



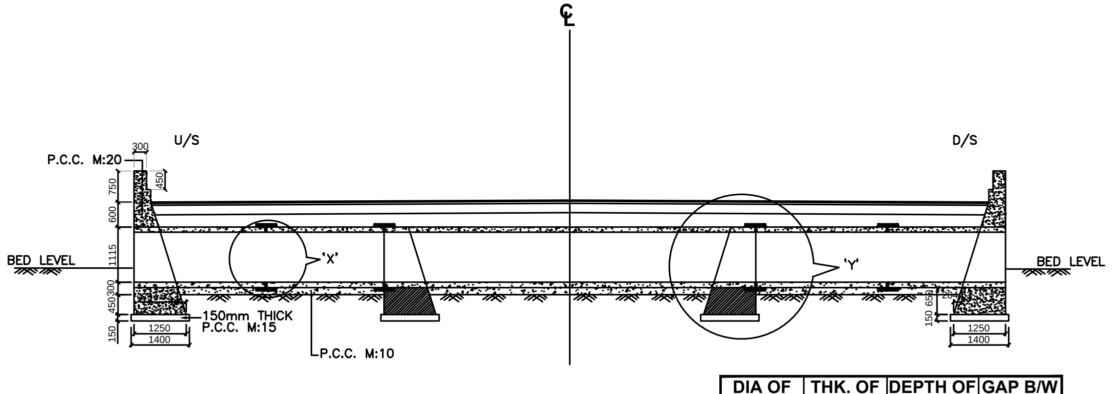
PLAN

TYPICAL GAD FOR SINGLE PIPE CULVERT

NOTES:

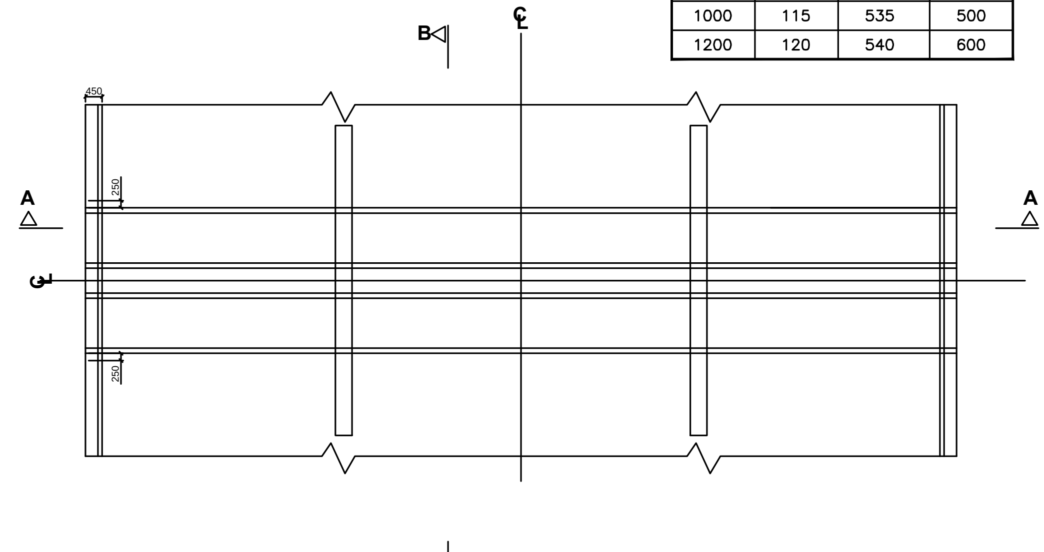
1. THIS DRAWING HAS TO BE READ IN CONJUNCTION WITH PPWCS/BR/SD/101 TO 103
2. THIS DRAWING IS VALID ONLY FOR FIRST CLASS BEDDING CAN BE USED FOR MAX. HEIGHT OF FILLING 4m.
3. PIPES SHOULD CONFORM TO IS :-458.
4. LONGITUDINAL SLOPE OF PIPE SHOULD BE MINIMUM OF 1:1000
5. ALL DIMENSIONS IN MILLIMETERS EXCEPT WHERE OTHERWISE MENTIONED.
6. FORMATION LEVEL FOLLOW AS PER THE HIGHWAY ALIGNMENT.
7. THE INVERT LEVEL OF NEW PIPE CULVERT SHALL NOT BE HIGHER THAN THE EXISTING INVERT LEVEL
8. IF CONSTRUCTION OF HEAD WALL FALLS OUT SIDE ROW, SIDE SLOPE MUST BE ADJUSTED ACCORDINGLY TO ACCOMMODATE THE STRUCTURE INSIDE ROW.
9. THE PIPE SHALL BE JOINTED AS PER MORTH SPECIFICATION CLOSE-2906.

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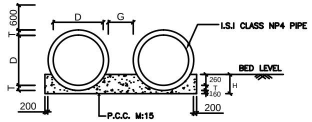


SECTION A-A

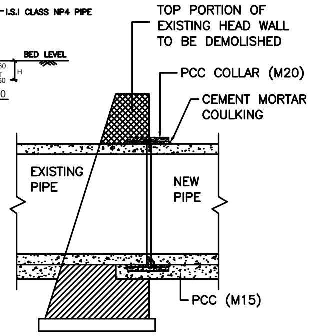
DIA OF PIPE `D'	THK. OF PIPE `T'	DEPTH OF BASE `H'	GAP B/W PIPE `G'
900	100	520	450
1000	115	535	500
1200	120	540	600



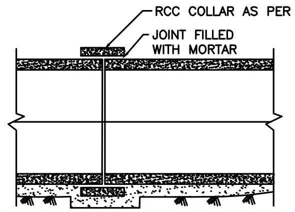
PLAN



SECTION B-B



DETAILS OF 'Y'



DETAILS OF 'X'

NOTES:

1. THIS DRAWING HAS TO BE READ IN CONJUNCTION WITH PPWCS/BR/SD/101 TO 103
2. THIS DRAWING IS VALID ONLY FOR FIRST CLASS BEDDING CAN BE USED FOR MAX. HEIGHT OF FILLING 4m.
3. PIPES SHOULD CONFORM TO IS :-458.
4. LONGITUDINAL SLOPE OF PIPE SHOULD BE MINIMUM OF 1:1000
5. ALL DIMENSIONS IN MILLIMETERS EXCEPT WHERE OTHERWISE MENTIONED.
6. FORMATION LEVEL FOLLOW AS PER THE HIGHWAY ALIGNMENT.
7. THE INVERT LEVEL OF NEW PIPE CULVERT SHALL NOT BE HIGHER THAN THE EXISTING INVERT LEVEL
8. IF CONSTRUCTION OF HEAD WALL FALLS OUT SIDE ROW, SIDE SLOPE MUST BE ADJUSTED ACCORDINGLY TO ACCOMMODATE THE STRUCTURE INSIDE ROW.
9. THE PIPE SHALL BE JOINTED AS PER MORTH SPECIFICATION CLOSE-2906.

TYPICAL GAD FOR DOUBLE PIPE CULVERT

DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.

(A) GENERAL

I. The design is according to the following codes :-

a. IRC:5	–	1998
b. IRC:6	–	2010
c. IRC:18	–	2000
d. IRC:21	–	2000
e. IRC:22	–	2000
f. IRC:78	–	2000
g. IRC:83(PART I)	–	1999
h. IRC:83(PART II)	–	1987
i. IRC:SP:33	–	1989

j. Specifications for ''Roads & Bridges'' (4th revision) by MORTH.

II. All dimensions are in mm (unless otherwise specified) & chainages are in metre. Only written dimensions shall be followed. No dimensions shall be scaled.

III. The following loads have been considered in the design:-

a. One lane of IRC class 70R or two lanes of IRC class, A, on carriageway, whichever governs.

b. Footpath load of 5kN/sqm for superstructure having footpaths.

c. Wearing coat load of 2kN/sqm.

IV. The designs are applicable for "moderate and "severe" conditions of exposure.In case of "severe" conditions suitable anti-corrosion treatment as approved by the Engineer may be provided to reinforcement bars and exposed concrete surface.

(B) MATERIALS SPECIFICATIONS

Concrete

I. Concrete shall be design mix and have a minimum 28 days characteristic strength As given below on 150mm cubes.

STRUCTURAL ELEMENT		CONCRETE CHARACTERISTIC STRENGTH
Prestressed girders including deck slab	–	40/45 Mpa
Rcc girders including deck slab	–	35 Mpa
Piers, Pier cap, Well, Well cap, Abutments, Wing wall, Rcc railing	–	35 Mpa
Pile, Pile cap	–	35 Mpa
Crash barrier	–	40 Mpa

II. Ordinary Portland cement conforming to IS:269 or High Strength Ordinary Portland Cement conforming to IS:8112 capable of achieving the required design concrete strength shall only be used.

III. To improve workability of concrete and cement grout, admixtures conforming to IS:6925 and IS:9103 could be permitted subject to satisfactory proven use. Admixtures generating hydrogen, nitrogen, chlorides etc. should not be used.

IV. Cement content in RCC members shall neither be less than 400 kg/cum nor more than 540 kg/cum of concrete.

V. Maximum water cement ratio shall be restricted to 0.40.

VI. The nominal maximum size of aggregate to be used in RCC and PSC work shall be 20mm.

VII. Minimum clear cover to reinforcement shall be 70mm at surfaces in direct contact With soil and/or water, and 50mm at the remainder, unless otherwise noted.

VIII. 12mm thick plaster in cement mortar 1:3 to be applied on the top surface of the Deck slab before filling.

Sheathing

I. Sheathing shall be of "Drossbach" type 75mm ID manufactured from minimum o.4mm thick bright metal strip. It shall be tested as per IRC:18-1985, Appendix 1.

II. The joints of all sheathing shall be water tight and conform to provisions contained in appendix-2 of IRC:SP:33-1989.

Water

I. Water to be used in concreting, grouting and curing shall conform to clause 5.1(ii) of IRC:SP:33-1989.

Reinforcement

I. All reinforcing steel shall be of High Yield Strength TMT-PC Bars (Grade designation Fe 415/Fe 500) conforming to IS : 1786.Mild Steel bars Grade designation S 240 shall confirm to IS : 432 part-I

II. Notation of bar reinforcement shall be as follows:-

Example:- T 8 @ 200 C/C

- T – Type of bar as mentioned above
- 8 – Dia of bar
- 200 – Bar spacing
- C/C – Centre to centre

T represent Grade - S : 415 Grade Bar

ø represent Grade - S : 230 Grade Bar

Bar spacing indicated on the drawings shall be perpendicular to bars unless indicated in the drawing.

III. Steel spacer bars shall be provided between adjacent layers of parallel reinforcement and spaced at not more than 60 x smaller bar dia. The diameter of the spacer bar shall be at least 25mm but not less than the dia of the parallel reinforcements.

IV. Binding wires should be annealed 16 gauge mild steel wires free from any deleterious matters, dust etc.

V. At the locations where reinforcing bars are congested (like girder bulbs), Mechanical splices shall be used instead of over lapping to provide sufficient clearance Between adjacent bars.

Expansion Joints

I. The expansion joints must be robust, durable, water tight and replaceable. it must be provided over the full width of superstructure including kerb and footpath following the profile of the same (where relevant). expansion joints shall be obtained only from approved manufacturers and be of proven type. Details of expansion joints must be approved before commencement of construction. Site fabricated expansion joints shall be prohibited.

II. Expansion joints shall have the following additional essential features:-

a. For R.C.C.T-beam bridges, It shall cater for a total movement of 20mm with original gap of 40mm between concrete faces.

b. For PSC Girder Bridges, It shall cater for a total movement of ± 40mm

III. Fabricated steel parts shall be positioned accurately before concreting the portion of deck slab beyond the end faces of webs of box girder.

IV. Presence of manufacturer's representative at the time of positioning of embedded parts and installation of expansion joints is mandatory.

Weep holes

I. Weep holes 100ø 1.0m c/c staggered to be provided in

a. Abutment for Major and Minor bridges

b. Wing wall for Major, Minor bridge and Box structure.

c. End walls of Box structure

d. RCC or PCC Earth Retaining Wall.

(C) CONSTRUCTION

Sequence of prestressing

DAY (After casting of main girders)	ACTIVITY
14	Stressing of 1st stage cables
21	Casting of deck slab and cross girders
56	Stressing of 2nd stage cables
After 56	Installation of expansions joint and casting/laying of footpath (where applicable), kerb,wearing coat and railing.

Stressing of 1st stage cables can be done earlier on achieving a strength of 35 MPa.

Susbsequent activities can also be advanced keeping the same time intervals.

Launching Truss

The design is based on cast-in-situ construction.However launching of girders may be permitted for which the load from leg of launching truss should not exceed the value given in relevant drawing.

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(D) PRESTRESSING

I. The jacking force in each cable is 1543 kN to be imparted at both end simultaneously by using multi– strand jack.

II. The following basic properties of Prestress tendons have been considered in the design:–

a.	Area of 1 strand	=	98.7 sqmm
b.	Wobble coefficient k	=	0.0046 per metre
c.	Friction coefficient u	=	0.25
d.	Modulus of Elasticity of strand	=	1.95×10^{5} MPa
e.	Anchorage slip	=	6mm

III. Minimum strength of concrete at the time of tensioning of cables shall not be less than 35 MPa.

IV. Grouting shall be carried out as per Appendix 2 of IRC:18–2000. After the prestressing operations are completed and strands have been cut by acceptable tools, reusable metal cap with a central hole shall be fixed by four bolts to the guide plate of anchor to prevent leakage during grouting under pressure. Suitable rubber gasket shall be provided at the interface of metal cap and guide. External threaded pipe of O.D=19mm shall be used as nipple for grouting and shall protude from metal cap. All standard accessories and their details much as vent pipes, fixation details of vent pipe with sheathing, location of vent pipes and methodology of grouting shall be submitted by contractor in consultation with specialised agency for approval of the Engineer.

V. For future prestressing in case of bridge distress,single 12.7 mm dia. 7–ply class 2 strands as per IS:6006–1983 shall be used.The tensioning force per strand shall be 128.6 KN. Mono strand jacks shall be used for tensioning of strands utilising approved prestressing system only. The externally placed strands shall be protected by polyethelene sheathing and grouted.

VI. Anchorage recesses to be sealed with epoxy coating and filled with prepackaged non–shrink mortar. End face of girder, at the locations of anchorages, shall be coated with two coats of epoxy.

VII. Wherever necessary, reinforcement bars may be bent or shifted locally to avoid clashing with prestress tendons and anchorages, holes and recesses.

VIII. All anchorages plates are to be set at right angles to the tendon.

IX. Ducts for prestressing steel shall be securely fastened in place to prevent movement Until concrete is placed and hardened. Ducts shall be supported at intervals not exceeding 500mm or as shown on the drawings.

X. Welding is not permitted within 3000mm of any tendon or tendon duct.

XI. Prestressing steel shall be accurately located and maintained in position as per drawing, within a maximum tolerance of ± 5mm. The sheathing being supported and fixed at interval not exceeding 0.75m by fixing steel chairs on spacer bars to secondary reinforcement in such a manner that the profiles of the cables is in no way disturbed by heavy vibration and / or by the pressure of wet concrete.

XII. During concreting and uptill final setting of concrete it shall be ensured that the cable moves freely in the sheath by moving the cables forward and backward.

(E) WORKMANSHIP/DETAILING

I. Minimum clear cover to reinforcement shall be 70mm at surfaces in direct contact With soil and/or water, and 50mm at the remainder, unless shown otherwise in the drawing.

II. For ensuring proper cover of concrete to reinforcement bars, the mortar blocks of same grade as of parent concrete shall be provided & shouid be able to withstand the crushing during construction.

III. Welding of reinforcement bars shall not be permitted.

IV. Bending of reinforcement bars to be as per IS:2502–1963.

V. Minimum lap length shall be kept as 60xd where "d" is the diameter of bar.Lap shall be staggered at such a way that more than 50 bars are lapped at one location.

VI. Supporting chairs of 12mm dia shall be provided at suitable intervals as per IS:2502.

VII. Sharp edges of concrete shall be chamfered (25mmx25mm).

VIII. Formwork details shall be submitted by the contractor for the approval and that shall be load tested before use.

IX. Proper compaction of concrete shall be ensured by use of form and/or needle vibrators.Use of full width screed vibrators for compaction of concrete in deck slab shall be ensured.

X. Shuttering plates shall suitably be stiffened to enable the compaction by form vibrators.

XI. All setting out dimensions, reduced levels, concrete dimensions & cable profiles to be verified on site before construction commences. Any discrepancy to be brought to the notice of the Engineer immediately.

XII. The location of jacks for lifting up the superstructure to replace bearing etc. is shown thus ↑ This shall be distinctly etched on soffit of superstructure and pier/abutment caps.

XIII. During jacking operation all jacks placed under one end cross girder shall be operated simultaneously using stress control system so as to ensure that the reaction on both the jacks is equal at all times.

Construction joints

I. Construction joints shall be provided only at locations shown on the drawings. Concreting operation shall be carried out continuously up to the construction joints.

II. The concrete surface at the joint shall be brushed with a stiff brush after casting while the concrete is still fresh and it has only slightly hardened.

III. Before new concrete is poured, the surface of old concrete shall be prepared as under :–

(a) For hardened concrete, the surface shall be thoroughly cleaned to remove debris and laitance and made rough so that 1/4 of the size of aggregate is exposed but without dislodging the aggregate or structurally damaging the concrete.

(b) For partially hardened concrete, the surface shall be treated by wire brush followed by an air jet. The old surface shall be soaked with water, without leaving puddies, immediately before starting oncreting to prevant absorption of water from new concrete.

IV. New concrete shall be thoroughly compacted in the region of the joint.

(F) SPECIAL NOTE FOR PRESTRESSING

If the calculated elongation is reached before the calculated gauge pressure is obtained, continue tensioning till the calculated gauge pressure is attained, provided the elongation does not exceed 1.05 times the calculated elongation. If this elongation is achieved before the calculated gauge pressure is attained, stop stressing and inform the Engineer.

If the calculated elongation has not been reached continue tensioning by intervals of 5kg/sqcm till the calculated elongation is attained, provided the gauge pressure does not exceed 1.05 times the calculated gauge pressure.

If the elongation at 1.05 times the calculated gauge pressure is less than 0.95 times the calculated elongation, the following measures must be taken, in succession, to define the cause of this lack of elongation.

- Recalibrate the pressure gauge
- Check the functioning of the jack, pump and leads
- De–tension the cable. Slide it in its duct to check that it is not blocked by mortar which has entered through the holes in the sheath. Re–tension the cable, if free.

If the required elongation is not obtained, further finishing operations such as cutting or sealing should not be undertaken without the approval of the Engineer.

DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.

NOTES FOR REPAIR AND REHABILITATION

1. OBJECTIVE OF REPAIR TO RCC STRUCTURAL ELEMENTS:–
   - REMOVE CAREFULLY AND WITHOUT DAMAGE TO ADJACENT STRUCTURES TO BE LEFT IN PLACE, ALL SUB–STANDARD MATERIALS.
   - EXPOSE AND PROTECT CORRODED REINFORCEMENT.
   - REPLACE SUB–STANDARD MATERIALS BY NEW SPECIFIED MATERIALS.
2. METHOD STATEMENT OF ALL WORKS SHALL BE GIVEN BY THE CONTRACTOR GIVING WORKING DETAILS & DRAWINGS OF METHODOLOGY PREPARED FOR EACH ACTIVITY OF THE REPAIR & REHABILITATION WORKS FOR EACH AFFECTED STRUCTURE.
3. REPRESENTATIVE OF MANUFACTURER OF PROPREITARY MATERIALS AND EQUIPMENT TO BE AVAILABLE AT SITE FOR TRAINING CONTRACTOR'S PERSONNEL AND CERTIFYING WORK AS PER THEIR SPECIFICATIONS.
4. USE OF SPECIAL PROPRIETARY MATERIALS IS ENVISAGED. THIS IS BASED ON "FOSROC" PRODUCTS. APPROVED EQUIVALENT CAN BE USED.
5. USE OF SPECIAL PROPRIETARY MECHANICAL EQUIPMENTS FOR DRILLING, BREAKING, CHIPPING ETC IS ENVISAGED. THE EQUIPMENTS FOR THIS PURPOSE SHALL BE OF SPECIALISED PORTABLE TYPE "HILTI" MANUFACTURE. FOR DEMOLITIONS & BREAKING HILTI EQUIPMENT NO.TE804 & FOR DRILLING HOLES IN CONCRETE & STEEL HILTI EQUIPMENT NO.TE–75 IS RECOMMENDED. MOBILISATION AND USE OF SUCH EQUIPMENTS SHALL BE CONSIDERED INCIDENTAL TO THE WORKS. NO SEPARATE PAYMENT SHALL MADE ON THIS ACCOUNT. APPROVED EQUIVALENT CAN BE USED.
6. PRE–REPAIR TESTS:

   TO UNDERSTAND THE GENERAL EXTENT/DEPTH OF DISTRESS, CONTRACTOR'S REPAIR EXPERT MAY CONDUCT SOME PRE–REPAIR TESTS (AT THE DISCRETION OF ENGINEER) ON SAMPLES OF SLABS AND/OR OTHER PARTS OF STRUCTURE CONFORMING IRC:SP–35,AS BELOW:

   - CARBONATION TEST: 2% PHENOLPHTHALEIN SOLUTION ON EXPOSED CONCRETE SURFACE
   - CHLORIDE TEST: TESTING PIECES OF CONCRETE (FROM GIVEN DEPTH) FOR CHLORIDE CONTENT.
   - CORING: FOR ANALYSING IN LABORATORY FOR VARIOUS PROPERTIES INCLUDING CONCRETE STRENGTH.
   - PROFOMETER TEST: BEFORE TAKING UP CERTAIN TYPE OF REPAIR ACTIVITIES EG. MAKING HOLES IN REINFORCED CONCRETE ELEMENTS, IT MAY BE ESSENTIAL TO PRE–DETERMINE THE LOCATION OF EXISTING REINFORCEMENT BARS IN THE CONCRETE VICINITY. THIS SHALL BE DONE BY EMPLOYING INSTRUMENT "PROFOMETER–4" AVAILABLE FROM AIMIL LTD.,(OR APPROVED EQUIVALENT). THIS INSTRUMENT IS CAPABLE OF DETERMINING THE COVER AND DIA OF THE EXISTING REINFORCEMENT. OTHER METHODS LIKE CHISELING, DRILLING ETC FOR LOCATING EXISTING REINFORCEMENT BARS WOULD NOT BE PERMITTED.
   - HALF CELL POTENTIOMETER TEST: FOR DETERMINING EXTENT OF CORROSION OVER EMBEDDED LENGTH OF REBAR FROM EXPOSED END TEST PANELS SIMULATING ACTUAL FIELD CONDITION AS PER 2807.7 OF MOST SPECIFICATION. THUS THE REPAIR TEAM SHOULD COMPLETELY QUANTIFY THE EXTENT OF CORROSION.
   - SCHMIDT HAMMER & OTHER TESTS: THESE ARE USED TO MEASURE HARDNESS OF CONCRETE SURFACE WHICH CAN BE RELATED TO ITS STRENGTH. THE INSTRUMENT USED IS VERY HANDY. THE PULLOUT METHODS AND PENETRATION RESISTANCE TECHNIQUES ARE ALSO ADOPTED FOR ESTIMATION OF STRENGTH OF CONCRETE AND ASSESSMENT OF ITS OVERALL QUALITY.
   - Ultrasonic pulse velocity measurement: The quality of concrete can be assessed by passing through concrete the ultrasonic pulse and measuring the velocity, measured value may be affected by surface texture, moisture content, temperature, specimen size, reinforcement and stress. Co–relations with strength are difficult to make and will be influenced by types and proportions of mix constituent and maturity. Calibration on test cores is essential.

7 BOQ IS APPROXIMATE AND SUBJECT TO CHANGE INSPECTIONS ARE TO BE CARRIED OUT JOINTLY & APPROVED BY THE ENGINEER.

8 ACCESS FOR INSPECTION & CARRYING OUT ALL REPAIR WORK TO BE ARRANGED BY CONTRACTOR. WORKING PLATFORMS TO BE PROVIDED BY CONTRACTOR SHALL BE SPACIOUS, STABLE AND STRUCTURALLY SOUND. THESE SHALL BE CONSIDERED INCIDENTAL TO THE WORKS. NO SEPARATE PAYMENT SHALL MADE ON THIS ACCOUNT.

9 IN CASE DIRT WALL / ABUTMENT CAP REQUIRE REPAIRS / DISMANTLING OR REPLACEMENT OF BEARING ON ABUTMENT, ONLY PART OF DIRT WALL SHALL BE DISMANTLED AT A TIME TO ENSURE THAT THE APPROACH IS SERVICEABLE AND PERMITS TRAFFIC MOVEMENT ON BRIDGE DURING RECTIFICATIONS.

10 IN CASE EXPANSION JOINTS ARE BLOCKED OR DAMAGED THE SAME INCLUDING ANY DEBRIS OF ETC. SHALL BE REMOVED CAREFULLY. THIS SHALL BE CONSIDERED INCIDENTAL TO THE WORK PROVISION OF NEW EXPANSION JOINTS AND NO SEPARATE PAYMENT SHALL BE MADE FOR REMOVAL OF EXISTING JOINT, DEBRIS ETC.

11 THE SERVICE LINES, IF ANY SHALL BE CAREFULLY DIVERTED AS DIRECTED BY THE ENGINEER BEFORE DISMANTLING WORK STARTS. THEY SHALL BE RE–INSTATED TO ORIGINAL LOCATION OR AS DIRECTED BY THE ENGINEER IN CHARGE . THIS WORK SHALL BE CONSIDERED INCIDENTAL TO ALL DEMOLITION WORKS AND NO SEPARATE PAYMENT SHALL BE MADE ON THIS ACCOUNT.

12 STRUCTURAL CONCRETE SHALL CONFORM TO "SEVERE" CONDITIONS OF EXPOSURE AS PER MOST SPECIFICATIONS CLAUSE 1703.2. PARTICULAR ATTENTION IS DRAWN TO CLAUSE 1704.1 OF MOST SPECIFICATION INDICATING MINIMUM SLUMPS REQUIREMENTS FOR WHICH SUPERPLASTICISER CONPLAST SP337 OF FOSROC OR APPROVED EQUIVALENT SHALL BE ADDED AS PER MANUFACTURER'S SPECIFICATION.

13 ARRANGEMENT OF PASSAGE OF TRAFFIC ALONG A PART OF EXISTING CARRIAGE WAY OR ALONG DIVERSIONS DURING CONSTRUCTION SHALL REMAIN THE RESPONSIBLITY OF THE CONTRACTOR . ADDITIONAL STEEL TRESTLES AND PROVISION OF STEEL RAMPS REQUIRED TO FACILITATE PASSAGE OF TRAFFIC ALONG PART OR FULL EXISTING CARRIAGEWAY SHALL BE CONSIDERED INCIDENTAL TO THE WORKS. NO SEPARATE PAYMENT SHALL MADE ON THIS ACCOUNT. METHOD STATEMENT TO BE SUBMITTED BY CONTRACTOR SHALL BE BASED ON THIS PREMISE AND SUBJECT TO APPROVAL OF THE ENGINEER. IN SOME BRIDGES IT MAY BE ESSENTIAL TO DIVERT THE TRAFFIC ALONG A TEMPORARY DIVERSION. THE PAYMENT FOR TEMPORARY TRAFFIC DIVERSION WHERE IMPLEMENTED SHALL BE MADE AS PER MODIFIED CLAUSE NO 112.6 OF THE SUPPLIMENTRY SPECIFICATIONS OF THE TENDER DOCUMENT.

14 FLAT JACKS WHEN USED FOR LIFTING OF SUPERSTRUCTURE OR PORTION THEREOF SHALL BE MANUFACTURE OF OR APPROVED EQUIVALENT.

HYDRAULIC JACKS USED SHALL BE OF APPROVED MAKE & HAVE THE FACILITIES LIKE HYDRAULIC COUPLING, MECHANICAL LOCKING ETC THESE SHALL INVARIABLY BE CALIBERATED FREQUENTLY AS DESIRED BY THE ENGINEER.

STEEL TRESTLE USED FOR LIFTING SUPERSTRUCTURE SHALL BE DESIGNED IN ACCORDANCE WITH IRC:24–1967.

JACKS ARE TO BE USED ONLY FOR LIFTING PURPOSES AND SHOULD BE MECHANICALLY LOCKED THEREAFTER. THE LOAD SHOULD BE TRANSFERRED AS SOON AS PRACTICABLE ON TO SEPARATE STEEL / WOODEN PACKINGS AND WEDGES FOR SAFETY. FPCC

15 FOR BONDING NEW CONCRETE TO OLD CONCRETE, ALL DEFECTIVE OR WEAK CONCRETE SHALL BE REMOVED AS PER SPECIFICATIONS & EQUIPMENTS WITHOUT DAMAGING EXISTING REINFORCEMENT OR OTHER EMBEDMENT ITEMS. ALL LOOSE MATERIAL ARROUND EXISTING EXPOSED CONCRETE & REINFORCEMENT SHALL BE REMOVED BY USING SAND BLASTING OR ANY OTHER APPROVED SCHEME. AFTER CLEANING EXPOSED CONCRETE SURFACE, CONCRETE PRIMER SHALL BE APPLIED ON PREPARED CONCRETE SURFACE & REINFORCEMENT PRIMER ON EXPOSED REINFORCEMENT AS PER ADDITIONAL SPECIFICATIONS TO FACILITATE PROPER BONDING BETWEEN NEW & OLD CONCRETE.

16 FORMWORK SHALL BE LEAK TIGHT TAILOR MADE FOR EACH APPLICATION.

17 BEFORE TAKING UP CERTAIN TYPE OF REPAIR ACTIVITIES EG, MAKING HOLES IN REINFORCED CONCRETE ELEMENTS, IT MAY BE ESSENTIAL TO PRE–DETERMINE THE LOCATION OF EXISTING REINFORCEMENT BARS IN THE CONCRETE VICINITY. THIS SHALL BE DONE BY EMPLOYING NON DESTRUCTIVE METHODS WITH THE INSTRUMENT "PROFOMETER–4" AVAILABLE FROM AIMIL LTD., OR APPROVED EQUIVALENT. THIS INSTRUMENT IS CAPABLE OF DETERMINING THE COVER AND DIA OF THE EXISTING REINFORCEMENT. OTHER METHODS LIKE CHISELLING, DRILLING ETC FOR LOCATING EXISTING REINFORCEMENT BARS WOULD NOT BE PERMITTED.

18 BARS SHOWN THUS ø ARE MILD STEEL BARS AND SHALL CONFIRM TO IS–432/1982.

19 BARS SHOWN THUS Φ ARE COLD WORKED STEEL HIGH STRENGTH TMT–PC BARS AND SHALL CONFIRM TO IS:1786–1979.

20 BENDING AND FIXING OF REINFORCEMENT BARS SHALL BE CARRIED OUT AS PER IS 2502–1963.

21 RIVER TRAINING WORKS/PROTECTION WORKS:– LOCATION ALIGNMENT AND SIZE SHALL BE AS DIRECTED BY THE ENGINEER.

22 NOT MORE THAN 50% BARS SHALL BE LAPPED AT A LOCATION.

23 LAP LENGTH FOR BARS SHALL BE 60xDIA OF BARS (UOS).

24 IN CASE OF WIDENING OF SLAB TYPE SUPER STRUCTURE FOR THICKNESS AND REINFORCEMENT DETAIL REFER MOST STANDARD DRAWING. IF THE MOST SPECIFIED SLAB THICKNESS IS LESS THAN THE EXISTING SALB THICKNESS PROVIDE THE EXISTING SLAB THICKNESS IN CONCRETE GRADE M–30 AND REINFORCEMENT DETAIL AS/MOST.

25 IN RAPAIR BRIDGES WHERE STEEL RAILING OR ONLY GUARD STONE IS PROVIDED IN EXISTING BRIDGE IN PART OR FULL LENGTH, RCC RAILING (DETAIL DRG. NO:– (PPWCS/BR/DD/04) TO BE PROVIDED INSTEAD OF STEEL CRASH BARRIER AS SHOWN IN DETAIL DRAWINGS OF REPAIR.

26 IN BRIDGES RESTING ON OPEN FOUNDATION AND IDENTIFIED TO BE REHABILITATION / WIDENED SHALL BE REMOVED FROM TOP OF THE FOOTING AFTER REPAIR / WIDENING TOP OF THE FOUNDATION SHALL BE BACK FILLED WITH M–20 PCC TO MATCH THE ORIGINAL BED RIVER LEVEL, AS DIRECTED BY THE ENGINEER.

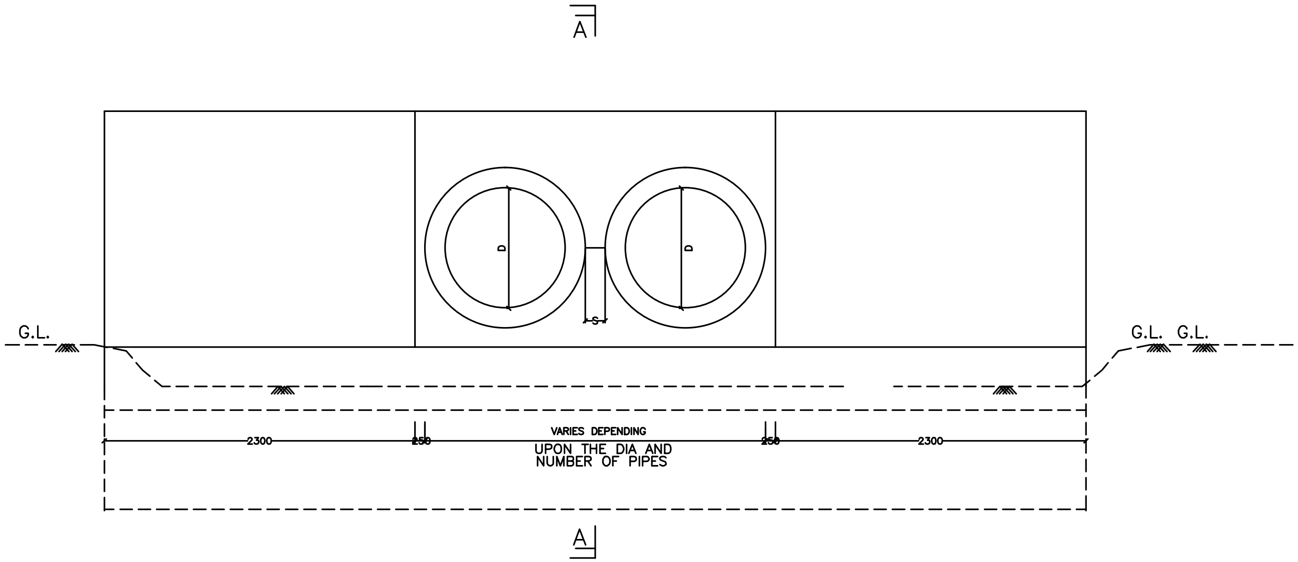
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.

GENERAL STANDARD NOTES

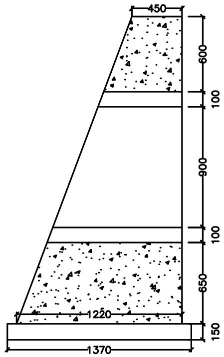
STANDARD NOTES FOR STRUCTURAL STEEL

- ALL BOLTS SPECIFIED IN DRGs. ARE HIGH STRENGTH FRICTION GRIP TYPE (HSFG) OF PROPERTY CLASS 8.8 CONFORMING TO IS: 3757–1985.
- ALL WASHERS SHALL CONFORM TO IS: 6649 – 1985. AND NUTS SHALL CONFORM TO IS: 6623 – 1985.
- EACH NUT AND BOLT SHALL BE ASSEMBLED WITH AT LEAST ONE WASHER.
- ALL THE HSFG BOLTS SHALL CONFORM TO SP 6 (4)1969, IS 4000 – 1967
- ALL HOLES IN MEMBERS SHOULD PREFERABLY BE DRILLED BURRS SHOULD BE REMOVED AND THE NOMINAL HOLE DIAMETER SHALL BE 13mm.
- ALL OIL, DIRT, LOOSE RUST, BURRS PAINT APPLIED FINISHES, ANY FORGIN MATERIAL AND ANY OTHER DEFECT ON THE CONTACT SURFACES SHOULD BE REMOVED BY SAND BLASTING. A CLEAN AS ROLLED SURFACE WITH TIGHT MILL SCALE IS ACCEPTABLE.
- PACKING SHALL BE PROVIDED WHEREVER NECESSARY TO ENSURE THAT THE LOAD IS TRANSMITTED EFFECTIVELY. ALL PACKINGS SHALL BE OF STEEL WITH A SURFACE CONDITION SIMILAR TO THAT OF ADJACENT MEMBERS.
- PAINTING OF THE STRUCTURE SHOULD BE CARRIED OUT AT AN EARLY STAGE AFTER TIGHTENING AND INSPECTION OF THE JOINTS TO PREVENT RUSTING IN CORROSIVE ATMOSPHERE. PAINTING SHALL BE CARRIED OUT AS PER MOST STANDARDS AND AS DIRECTED BY ENGINEER.
- METHODS OF TIGHTENING OF ALL HSFG BOLTS SHALL BE ONE OF THE FOLLOWING.
  - (i) CALIBRATED WRENCH TIGHTENING.
  - (ii) TURN OF NUT OR PART TURN TIGHTENING.
  - (iii) TIGHTENING BY USE OF DIRECT TENSION INDICATOR.
- "REUSE OF ANY HSFG BOLT AND NUT" SHOULD NOT BE DONE ONCE IT IS FULLY TIGHTENED.
- IT IS ADVISED TO MARK ALL TIGHTENED CONNECTIONS SO THAT THERE IS NO CONFUSION BETWEEN TIGHTENED BOLT AND YET TO BE TIGHTENED BOLTS.

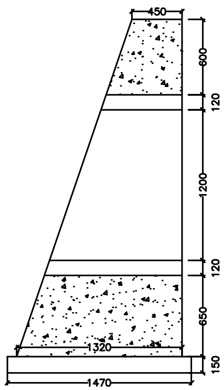
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



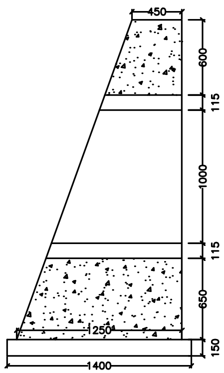
HEADWALL ELEVATION



HEAD WALL SECTION
FOR 900 MM DIA



HEAD WALL SECTION
FOR 1200 MM DIA



HEAD WALL SECTION
FOR 1000 MM DIA

LEGEND:

D = DIAMETER OF PIPE.

s = SPACING OF PIPES = 1/2 x D

NOTE:
THE SIMILAR HEADWALL DETAILS IS APPLICABLE TO SINGLE AND MULTIPLE PIPE CULVERTS.

DEPUTY EXECUTIVE ENGINEER
STATE ROAD PROJECT DIVISION
RAJKOT

EXECUTIVE ENGINEER
STATE ROAD PROJECT DIVISION
RAJKOT

SCALE :
NOT TO SCALE

STATE ROAD PROJECT DIVISION
RAJKOT

GOVERNMENT OF GUJARAT
ROADS AND BUILDINGS DEPARTMENT

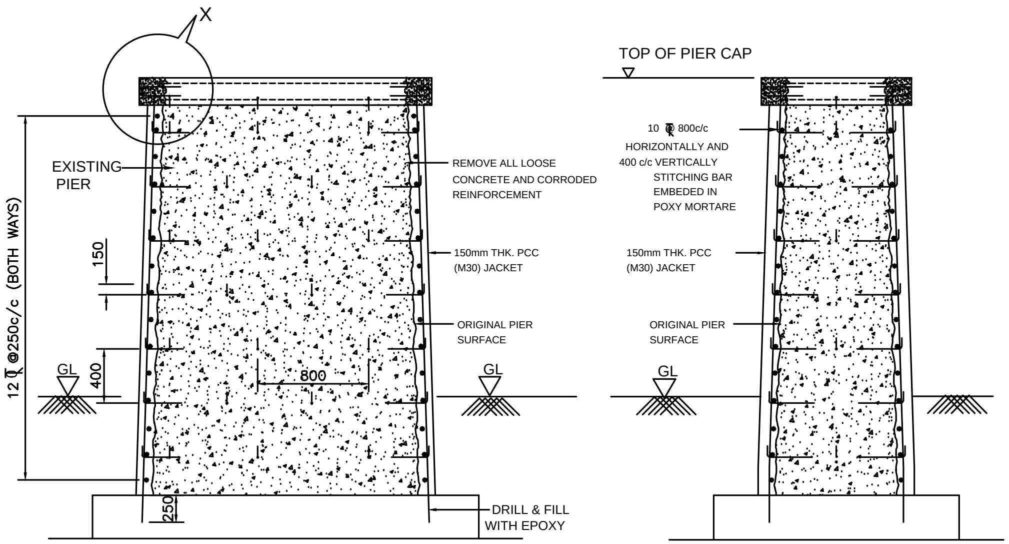
SAVARKUNDLA – DHASA ROAD SH 021 & 236
ROAD MAINTENANCE PROGRAMME

DATE: | PROJECT: | DWG No: | REV.

SAVARKUNDLA - DHASA ROAD SH - 236 & SH - 021

INDEX

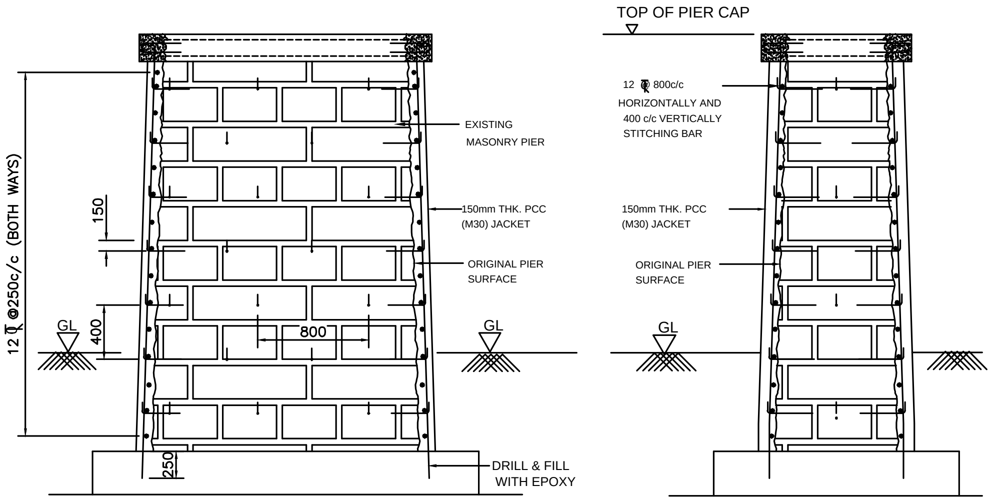
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



C.C PIER ELEVATION

SIDE VIEW

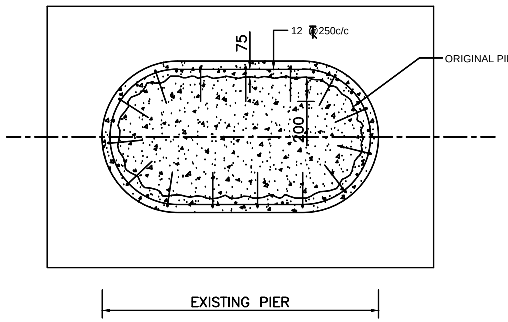
NOTE : THE THICKNESS OF CONCRETE REMOVED SHALL NOT BE LESS THAN 150mm IN ANY CASE.



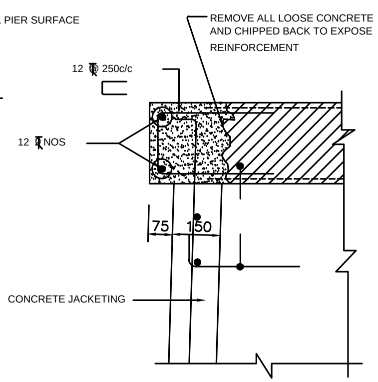
MASONRY PIER ELEVATION

SIDE VIEW

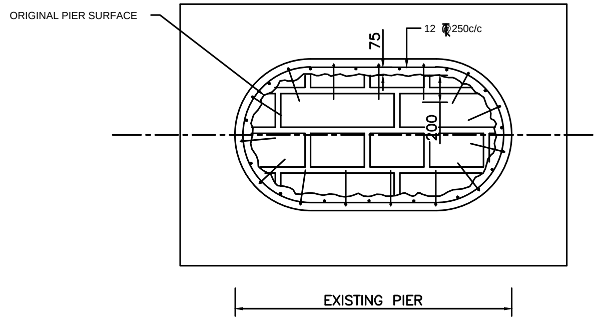
NOTE: EXISTING REINFORCEMENT NOT SHOWN FOR CLARITY



PLAN



DETAIL - X



PLAN

JACKETING NOTES :

PRIOR TO POURING THE CONCRETE OF THE CC/MASONRY PIER AND ABUTMENT JACKETS AND ALL THE CAPS:

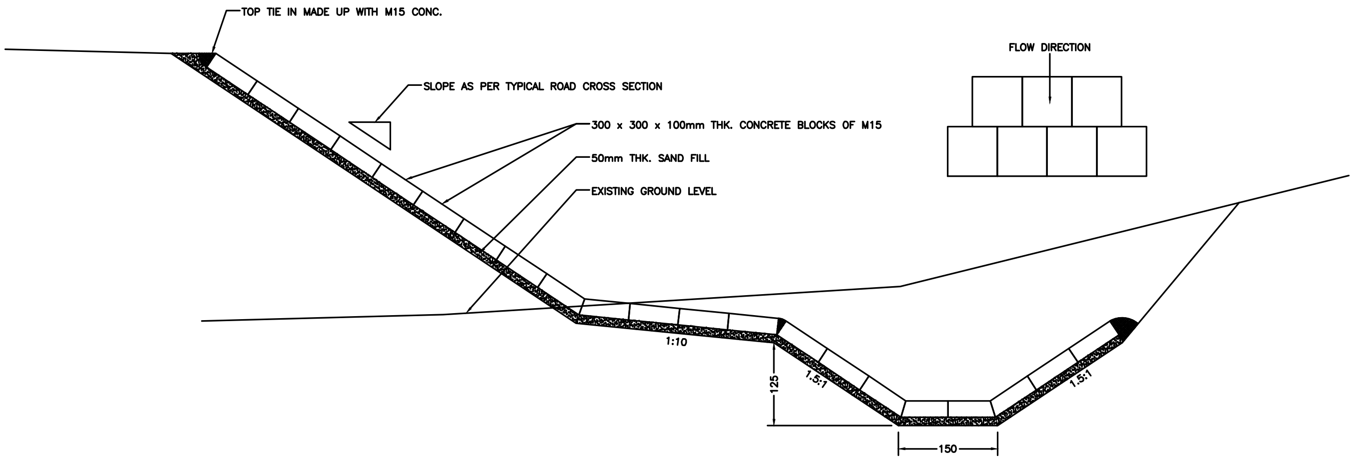
1. REMOVE FREE EXPOSED REINFORCEMENT OF CAP.
* REMOVE LOOSE MATERIAL/DUST BY SAND BLASTING FOR EXPOSED CONCRETE SURFACE AND REINFORCEMENT AS PER SPECIFICATION.
2. REPLACE IF CAP REINFORCEMENT CORRODED BADLY OR MISSING AFTER CERTIFYING WITH ENGINEER.
* INSTALL APPROPRIATE DOWELS EMBEDDED WITH EPOXY MORTAR TO LAP WITH THE NEW BARS WHERE REQUIRED AS DIRECTED BY ENGINEER AND AS PER ADDITIONAL SPECIFICATION.
* THE SIZE AND SPACING OF DOWELS SHALL MATCH THE ORIGINAL DESIGN.
3. APPLY CONCRETE PRIMER AS PER SPECIFICATION TO PREPARE CONCRETE SURFACE.
* APPLY NITOZINC PRIMER OF FOSROC (OR APPROVED EQUIVALENT)
4. PROVIDE WATER-TIGHT FORM WORK ALL AROUND THE PIER/ABUTMENT AND CAP.
5. POUR M30 CONCRETE IN PIER/ABUTMENT & CAP AND COMPACT IT AS PER SPECIFICATION.

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. DIMENSIONS ARE NOT TO BE SCALED. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
3. CONCRETE SHALL BE OF GRADE M30.
4. SIMILAR JACKETING METHODOLOGY TO BE ADOPTED FOR ABUTMENT, WHERE ONLY THE EXPOSED FACE OF MEMBER WOULD BE JACKETED.

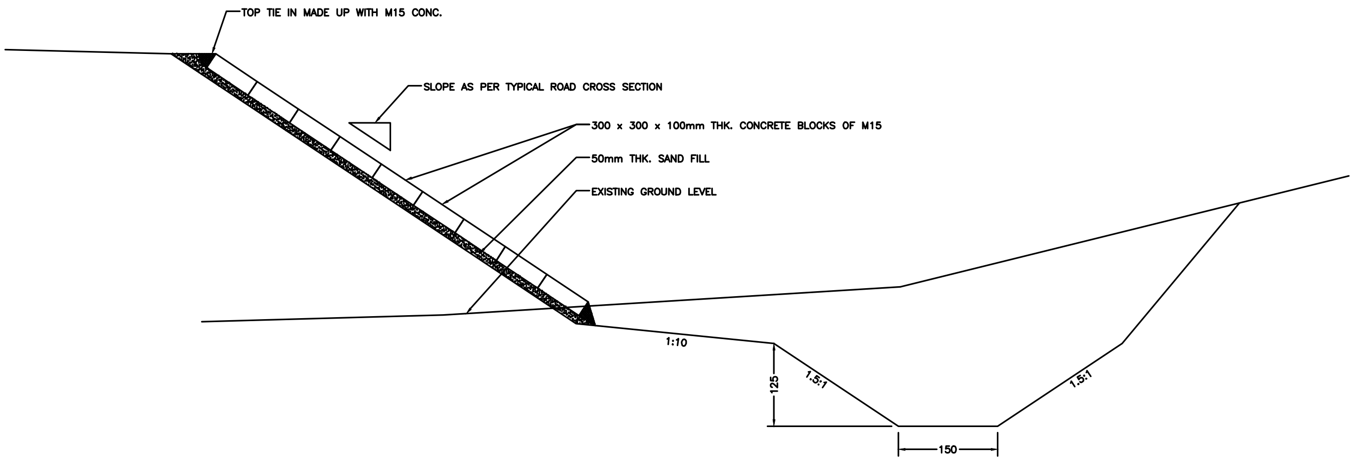
DETAIL OF C.C. JACKETING

DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



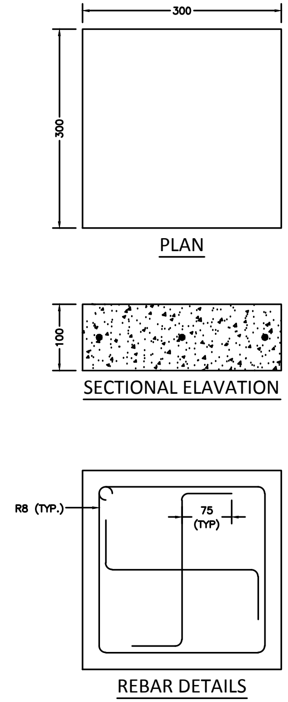
INSTALLATION OF TYPICAL CONCRETE BLOCKS ON SLOPE SURFACE

SCALE– 1:20



INSTALLATION OF TYPICAL CONCRETE BLOCKS ON SLOPE SURFACE

SCALE– 1:20



DETAILS OF CONCRETE BLOCKS OF M15 FOR SLOPE PROTECTION

SCALE– 1:5

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE SPECIFIED.

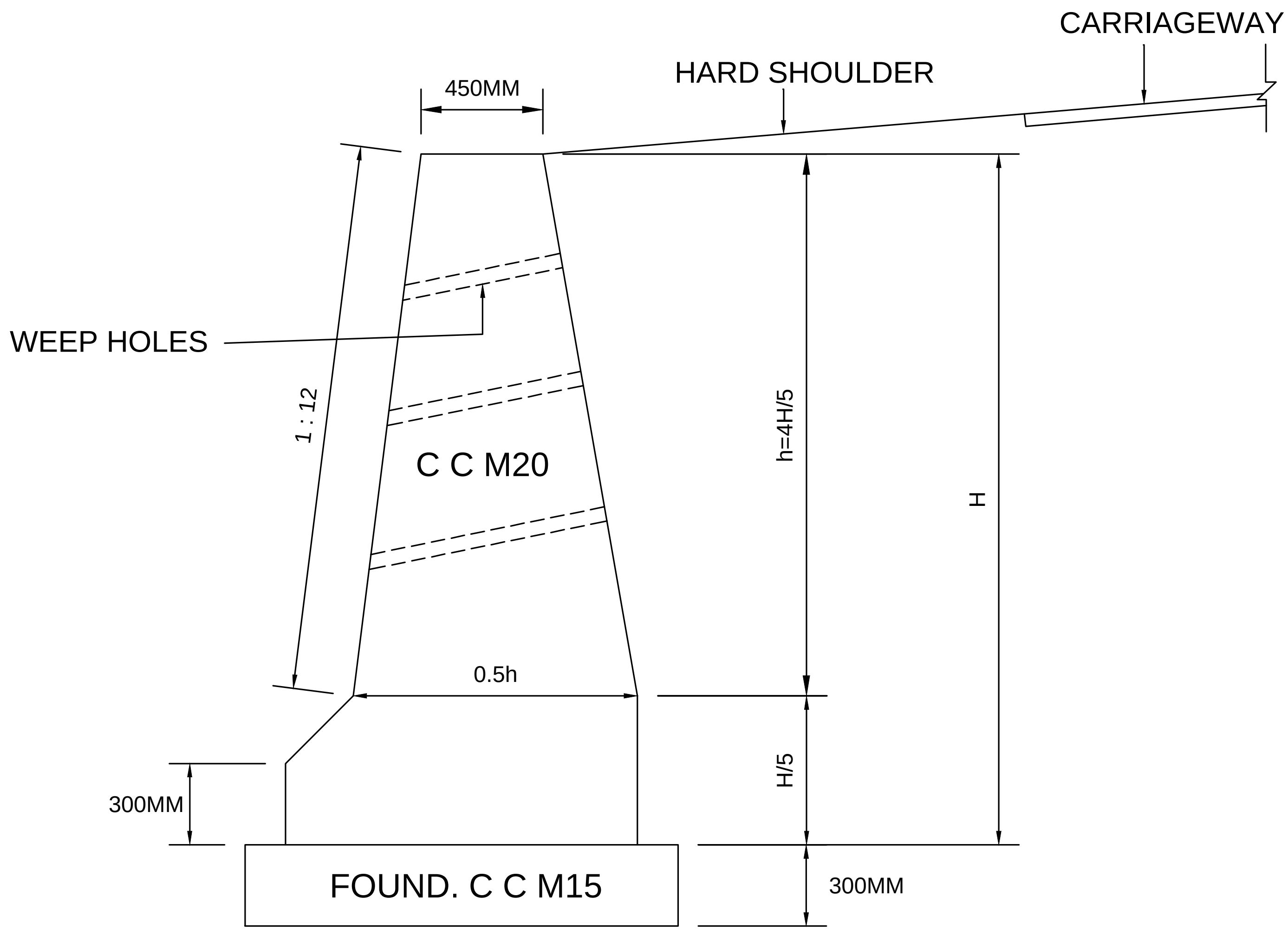
A2 AS SHOWN
A3 1:30, 1:7.5

MD–13

MISCELLANEOUS DETAILS
SLOPE PROTECTION AND DRAIN

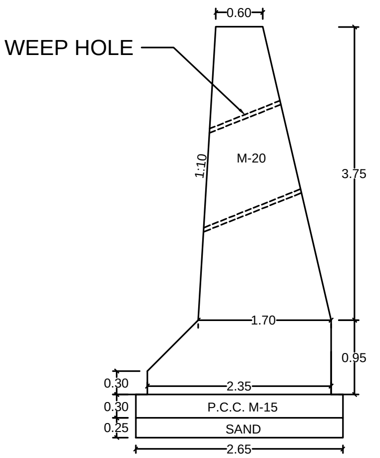
MD/13

DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.

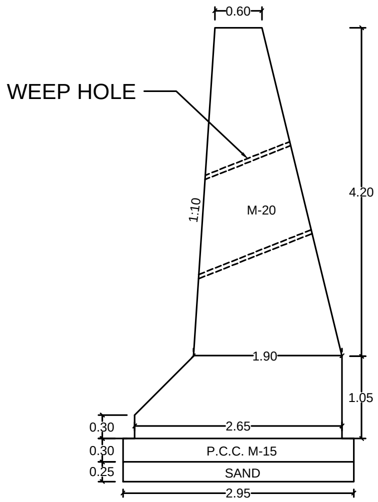


TYPICAL CROSS SECTION OF PROTECTIVE WALL

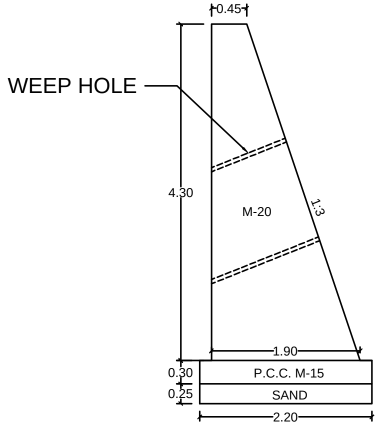
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TYPICAL SECTION
OF R.WALL FOR NAVALI BRIDGE
SH-236, CH-10+475

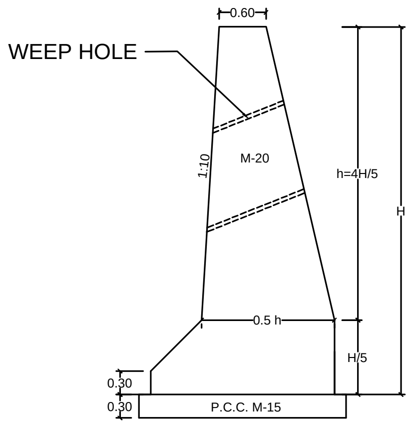


TYPICAL SECTION
OF R.WALL FOR GAGADIO CH-27+490 &
KHARI BRIDGE CH-32+117 SH-236

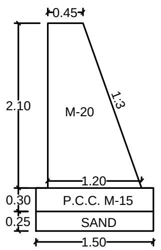


TYPICAL SECTION
OF PROCTECTIVE WALL AT
FOLLOWING CHAINAGE SH-236

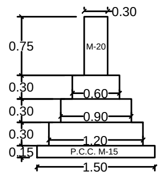
CHAINAGE	LHS	RHS
40+800 TO 41+000	200	-
41+000 TO 41+300	300	300
41+300 TO 41+700	400	-
43+750 TO 43+800	50	-
44+420 TO 45+350	930	-
45+250 TO 45+550	200	200
45+550 TO 46+350	800	-
46+350 TO 46+500	150	150
46+500 TO 46+775	275	-



TYPICAL SECTION
OF R.WALL



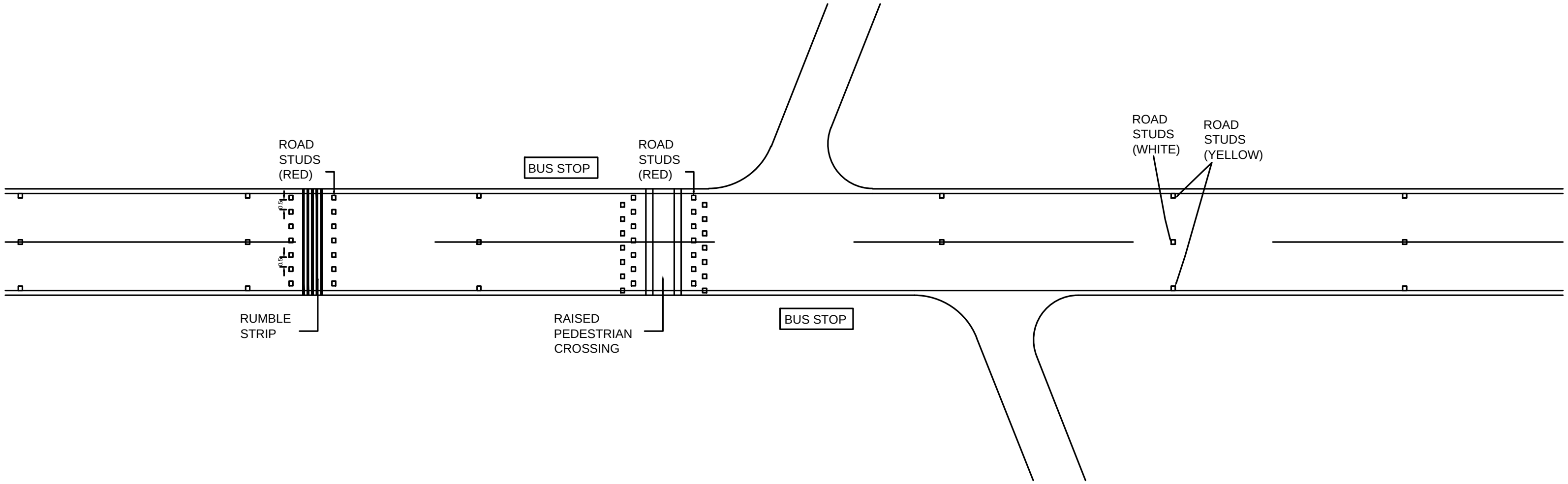
TYPICAL SECTION
OF PROCTECTIVE WALL IN SPILL SECTION
BETWEEN CH-13+100 TO 14+500, SH-236

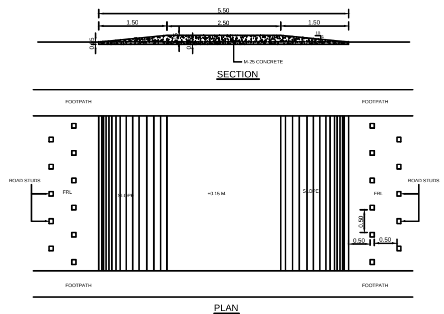


TYPICAL SECTION
OF APROAN CURTAIN WALL CH-28+690,
43+018 SH-236 & CH-12+300 SH-021

TYPICAL SECTION OF RETAINING WALL, PROTECTIVE WALL & CURTAIN WALL

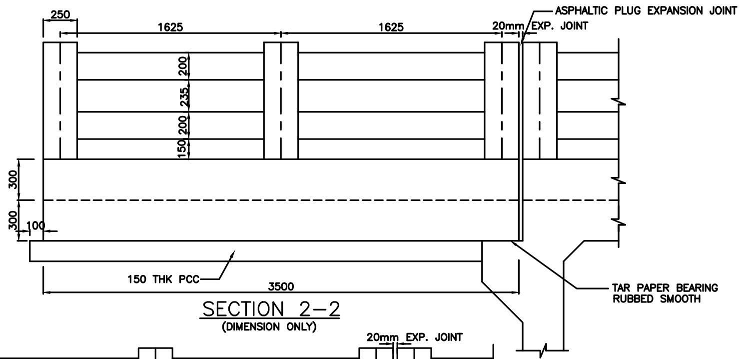
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



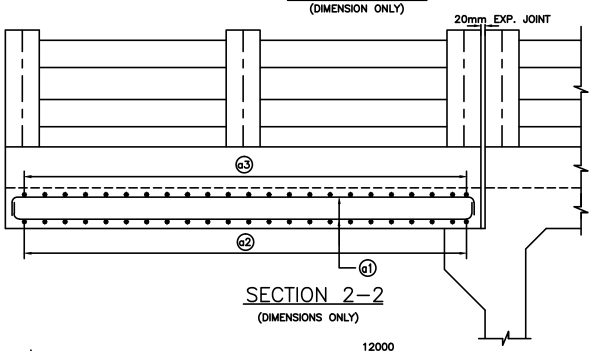


DETAILS OF RAISED PEDESTRAIN CROSSING

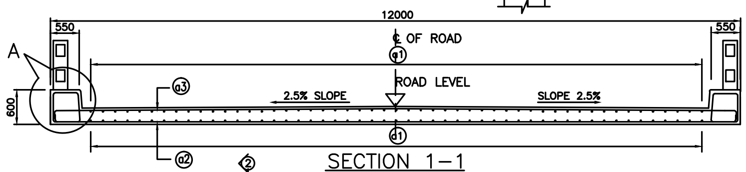
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



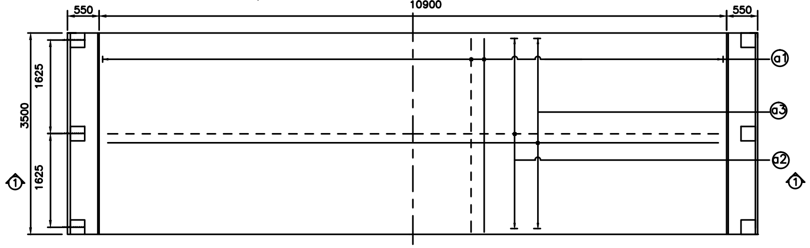
SECTION 2-2
(DIMENSION ONLY)



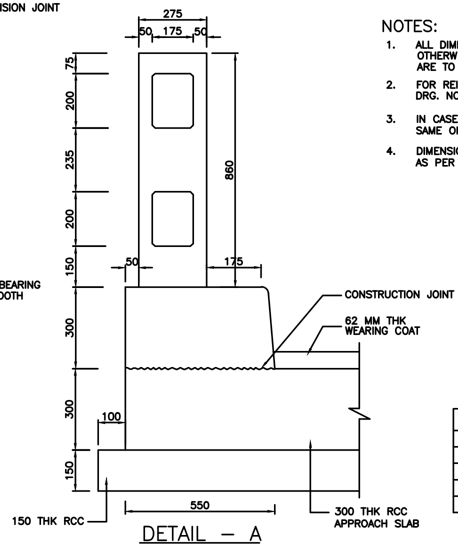
SECTION 2-2
(DIMENSIONS ONLY)



SECTION 1-1



2 PLAN OF APPROACH SLAB



DETAIL - A
(DIMENSIONS ONLY)

NOTES:

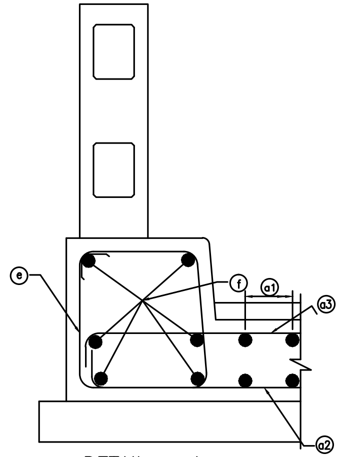
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
2. FOR REINFORCEMENT DETAIL OF RAILING REFER DRG. NO. PPWCS/BOX/DD/18 (SHEET 2 OF 3)
3. IN CASE OTHER TYPE OF RAILING IS USED, THE WEIGHT OF SAME ON EACH SIDE SHALL NOT EXCEED 3MT. PER METRE.
4. DIMENSIONS IN SCHEDULE OF REINFORCEMENT ARE GIVEN AS PER IS 2502.

BAR MKD.	REINFORCEMENT
a1	12 Ø @ 150 c/c
a2	12 Ø @ 150 c/c
a3	12 Ø @ 150 c/c
e	10 Ø 2L stirrups @ 150 c/c
f	6Nos.10 Ø

LEGEND :-

———— : TOP FACE BARS/ OUTER FACE BARS

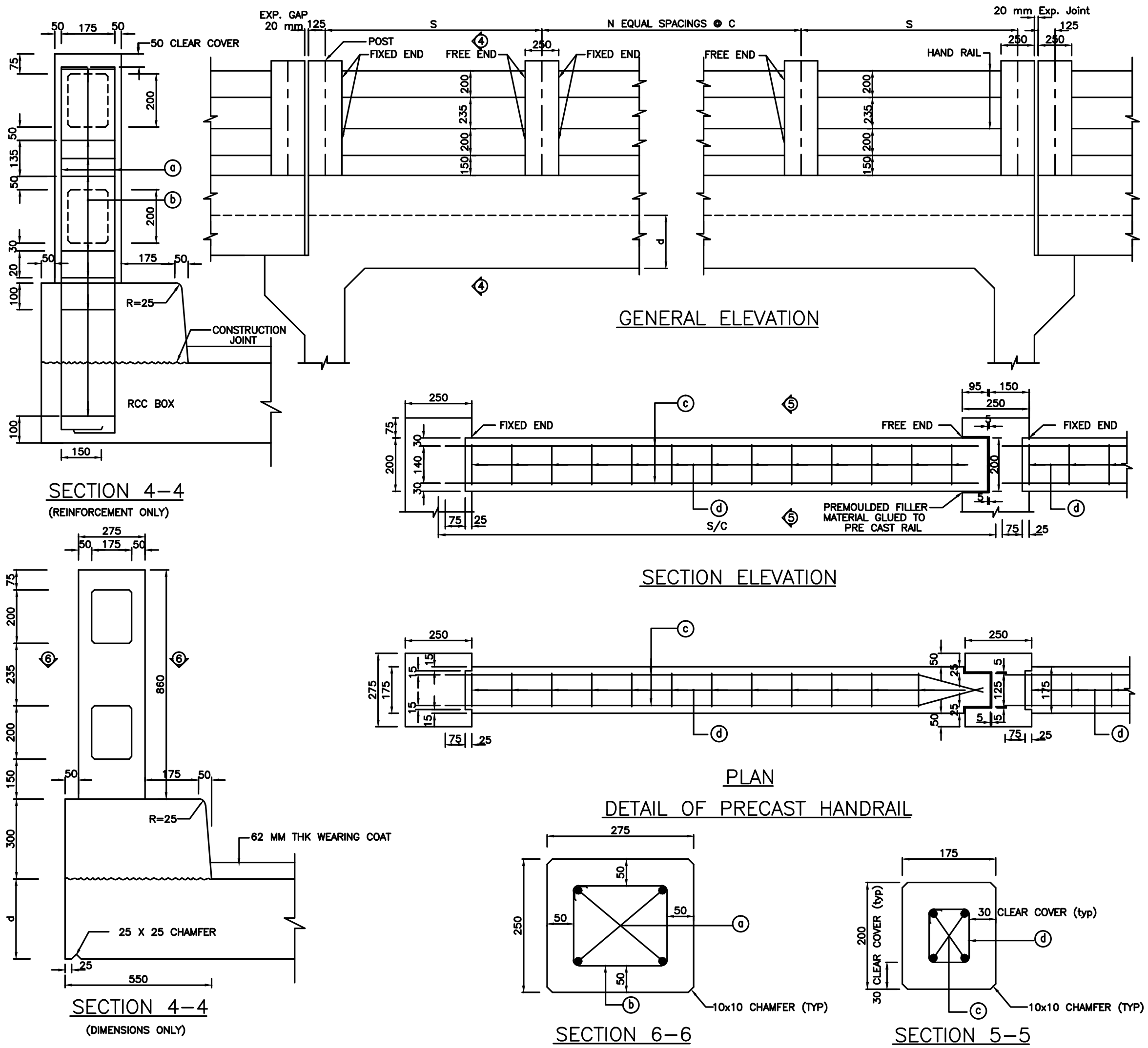
- - - - - - : BOTTOM FACE BARS/ INNER FACE BARS



DETAIL - A
(REINFORCEMENT ONLY)

DETAIL OF R.C.C. RAILING

DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA - DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
2. REINFORCEMENT OF RAILING POST SHOULD BE SUITABLE ANCHORED IN TOP SLAB OF BOX CULVERT.
3. CASTING OF POST SHALL BE DONE IN SINGLE POUR AFTER ACCURATELY POSITIONING THE PRECAST HANDRAIL.
4. FOR DETAILS & NUMBER OF POST & SPACING REFER DWG.NO. PPWCS/BOX/DD/18 (SHEET 3 OF 3)
5. FOR SCHEDULE OF REINFORCEMENT, REFER DRG.NO. PPWCS/BOX/DD/18 (SHEET 3 OF 3)

BAR MKD.	REINFORCEMENT
a	4Nos.12 Φ
b	8Nos.2L-8 Φ stirrups
c	4Nos.8 Φ
d	8 Φ 2L stirrups @ 100 c/c

DETAIL OF R.C.C. RAILING

DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.

TABLE: BAR BENDING SCHEDULE FOR RAILINGS AND POSTS

BOX – CELL DESIGNATION N/ab/EC	TOTAL TOP WIDTH TB (mm)	RAILING POST S (mm)	RAILING POST C (mm)	RAILING POST N (mm)	BAR MKD.– ⓐ 12 Φ 4 NOS. PER POST (78 / 180) LENGTH l (mm)	NOS. n=2xnp	TOTAL LENGTH lxn (m)	WEIGHT w1 (kg)	BAR MKD.– ⓑ 8 Φ RINGS 8 NOS. PER POST (175 × 180) LENGTH l (mm)	NOS. n=2xnp	TOTAL LENGTH lxn (m)	WEIGHT w1 (kg)
1/22/0	2600	1175	0	0	1593.80	24	38.25	33.96	677.33	48	32.51	12.83
1/23/0	2700	1225	0	0	1613.80	24	38.73	34.39	677.33	48	32.51	12.83
1/33/0	3840	1500	590	1	1663.80	32	53.24	47.27	677.33	64	43.35	17.10
1/34/0	3920	1500	670	1	1693.80	32	54.20	48.12	677.33	64	43.35	17.10
1/43/0	5000	1500	875	2	1693.80	40	67.75	60.15	677.33	80	54.19	21.38
1/44/0	5100	1500	925	2	1723.80	40	68.95	61.22	677.33	80	54.19	21.38
1/45/0	5260	1500	1005	2	1763.80	40	70.55	62.64	677.33	80	54.19	21.38
1/53/0	6140	1500	1445	2	1743.80	40	69.75	61.93	677.33	80	54.19	21.38
1/54/0	6240	1500	1495	2	1763.80	40	70.55	62.64	677.33	80	54.19	21.38
1/55/0	6400	1500	1050	3	1823.80	48	87.54	77.72	677.33	96	65.02	25.66
1/63/0	7440	1500	1397	3	1923.80	48	92.34	81.98	677.33	96	65.02	25.66
1/64/0	7500	1500	1417	3	1923.80	48	92.34	81.98	677.33	96	65.02	25.66
1/65/0	7500	1500	1417	3	1923.80	48	92.34	81.98	677.33	96	65.02	25.66
1/66/0	7700	1500	1483	3	1943.80	48	93.30	82.84	677.33	96	65.02	25.66
1/75/0	8700	1500	1363	4	1993.80	56	111.65	99.13	677.33	112	75.86	29.93
1/76/0	8900	1500	1413	4	2023.80	56	113.33	100.62	677.33	112	75.86	29.93
1/77/0	8900	1500	1413	4	2023.80	56	113.33	100.62	677.33	112	75.86	29.93
1/85/0	9900	1500	1330	5	2043.80	64	130.80	116.13	677.33	128	86.70	34.21
1/86/0	10000	1500	1350	5	2063.80	64	132.08	117.27	677.33	128	86.70	34.21
1/87/0	10400	1500	1430	5	2093.80	64	134.00	118.97	677.33	128	86.70	34.21
2/22/0	5040	1500	895	2	1643.80	40	65.75	58.38	677.33	80	54.19	21.38
2/23/0	5100	1500	925	2	1643.80	40	65.75	58.38	677.33	80	54.19	21.38
2/32/0	7100	1500	1283	3	1693.80	48	81.30	72.18	677.33	96	65.02	25.66
2/33/0	7190	1500	1313	3	1713.80	48	82.26	73.03	677.33	96	65.02	25.66
3/22/0	7340	1500	1363	3	1613.80	48	77.46	68.77	677.33	96	65.02	25.66
3/33/0	10740	1500	1498	5	1693.80	64	108.40	96.24	677.33	128	86.70	34.21
App Slab	3500	1625	0	0	1543.80	48	74.10	65.79	677.33	96	65.02	25.66

BOX – CELL DESIGNATION N/ab/EC	END RAILING: BAR MKD.– ⓒ 8 Φ 4 NOS. PER RAIL (250) LENGTH l (mm)	NOS. n=2xnp	TOTAL LENGTH lxn (m)	WEIGHT w1 (kg)	INTERMEDIATE RAILING: BAR MKD.– ⓒ 8 Φ 4 NOS. PER RAIL (250) LENGTH l (mm)	NOS. n=2xnp	TOTAL LENGTH lxn (m)	WEIGHT w1 (kg)	END RAILING: BAR MKD.– ⓓ 8 Φ RINGS @ 100c/c (115 × 140) LENGTH l (mm)	NOS. n=2xnp	TOTAL LENGTH lxn (m)	WEIGHT w1 (kg)	INTERMEDIATE RAILING: BAR MKD.– ⓓ 8 Φ RINGS @ 100c/c (115 × 140) LENGTH l (mm)	NOS. n=2xnp	TOTAL LENGTH lxn (m)	WEIGHT w1 (kg)
1/22/0	1100.00	32	35.20	13.89	0.00	0	0.00	0.00	537.33	80	42.99	16.96	0.00	0	0.00	0.00
1/23/0	1150.00	32	36.80	14.52	0.00	0	0.00	0.00	537.33	80	42.99	16.96	0.00	0	0.00	0.00
1/33/0	1425.00	32	45.60	17.99	515.00	16	8.24	3.25	537.33	104	55.88	22.05	537.33	16	8.60	3.39
1/34/0	1425.00	32	45.60	17.99	595.00	16	9.52	3.76	537.33	104	55.88	22.05	537.33	20	10.75	4.24
1/43/0	1425.00	32	45.60	17.99	800.00	32	25.60	10.10	537.33	104	55.88	22.05	537.33	56	30.09	11.87
1/44/0	1425.00	32	45.60	17.99	850.00	32	27.20	10.73	537.33	104	55.88	22.05	537.33	56	30.09	11.87
1/45/0	1425.00	32	45.60	17.99	930.00	32	29.76	11.74	537.33	104	55.88	22.05	537.33	64	34.39	13.57
1/53/0	1425.00	32	45.60	17.99	1370.00	32	43.84	17.30	537.33	104	55.88	22.05	537.33	96	51.58	20.35
1/54/0	1425.00	32	45.60	17.99	1420.00	32	45.44	17.93	537.33	104	55.88	22.05	537.33	104	55.88	22.05
1/55/0	1425.00	32	45.60	17.99	975.00	48	46.80	18.47	537.33	104	55.88	22.05	537.33	96	51.58	20.35
1/63/0	1425.00	32	45.60	17.99	1321.67	48	63.44	25.03	537.33	104	55.88	22.05	537.33	144	77.38	30.53
1/64/0	1425.00	32	45.60	17.99	1341.67	48	64.40	25.41	537.33	104	55.88	22.05	537.33	144	77.38	30.53
1/65/0	1425.00	32	45.60	17.99	1341.67	48	64.40	25.41	537.33	104	55.88	22.05	537.33	144	77.38	30.53
1/66/0	1425.00	32	45.60	17.99	1408.33	48	67.60	26.67	537.33	104	55.88	22.05	537.33	156	83.82	33.08
1/75/0	1425.00	32	45.60	17.99	1287.50	64	82.40	32.51	537.33	104	55.88	22.05	537.33	192	103.17	40.71
1/76/0	1425.00	32	45.60	17.99	1337.50	64	85.60	33.78	537.33	104	55.88	22.05	537.33	192	103.17	40.71
1/77/0	1425.00	32	45.60	17.99	1337.50	64	85.60	33.78	537.33	104	55.88	22.05	537.33	192	103.17	40.71
1/85/0	1425.00	32	45.60	17.99	1255.00	80	100.40	39.62	537.33	104	55.88	22.05	537.33	220	118.21	46.64
1/86/0	1425.00	32	45.60	17.99	1275.00	80	102.00	40.25	537.33	104	55.88	22.05	537.33	220	118.21	46.64
1/87/0	1425.00	32	45.60	17.99	1355.00	80	108.40	42.77	537.33	104	55.88	22.05	537.33	240	128.96	50.89
2/22/0	1425.00	32	45.60	17.99	820.00	32	26.24	10.35	537.33	104	55.88	22.05	537.33	56	30.09	11.87
2/23/0	1425.00	32	45.60	17.99	850.00	32	27.20	10.73	537.33	104	55.88	22.05	537.33	56	30.09	11.87
2/32/0	1425.00	32	45.60	17.99	1208.33	48	58.00	22.89	537.33	104	55.88	22.05	537.33	132	70.93	27.99
2/33/0	1425.00	32	45.60	17.99	1238.33	48	59.44	23.45	537.33	104	55.88	22.05	537.33	132	70.93	27.99
3/22/0	1425.00	32	45.60	17.99	1288.33	48	61.84	24.40	537.33	104	55.88	22.05	537.33	144	77.38	30.53
3/33/0	1425.00	32	45.60	17.99	1423.00	80	113.84	44.92	537.33	104	55.88	22.05	537.33	260	139.71	55.13
App Slab	1550.00	64	99.20	39.14	0.00	0	0.00	0.00	537.33	224	120.36	47.49	0.00	0	0.00	0.00

BOX – CELL DESIGNATION N/ab/EC	BAR MKD.– ⓔ 10 Φ RINGS @ 150 C/C IN KERB LENGTH l (mm)	NOS. n=2xnp	TOTAL LENGTH lxn (m)	WEIGHT w1 (kg)	BAR MKD.– ⓕ 10 Φ 6 NOS. PER KERB (100 / 100) LENGTH l (mm)	NOS. n=2xnp	TOTAL LENGTH lxn (m)	WEIGHT w1 (kg)	TOTAL WEIGHT (kg)
1/22/0	2040.58	34	69.38	42.78	2665.66	12	31.99	19.72	140.1
1/23/0	2082.31	36	74.96	46.22	2765.66	12	33.19	20.46	145.4
1/33/0	2186.65	50	109.33	67.41	3905.66	12	46.87	28.90	207.4
1/34/0	2249.26	52	116.96	72.11	3985.66	12	47.83	29.49	214.9
1/43/0	2249.26	66	148.45	91.53	5065.66	12	60.79	37.48	272.6
1/44/0	2311.86	68	157.21	96.92	5165.66	12	61.99	38.22	280.4
1/45/0	2395.33	70	167.67	103.38	5325.66	12	63.91	39.40	292.2
1/53/0	2353.60	82	192.99	118.99	6205.66	12	74.47	45.91	325.9
1/54/0	2395.33	82	196.42	121.10	6305.66	12	75.67	46.65	331.8
1/55/0	2520.54	84	211.73	130.54	6465.66	12	77.59	47.84	360.6
1/63/0	2729.22	98	267.46	164.90	7505.66	12	90.07	55.53	423.7
1/64/0	2729.22	100	272.92	168.27	7565.66	12	90.79	55.97	427.9
1/65/0	2729.22	100	272.92	168.27	7565.66	12	90.79	55.97	427.9
1/66/0	2770.96	102	282.64	174.26	7765.66	12	93.19	57.45	440.0
1/75/0	2875.30	116	333.53	205.64	8765.66	12	105.19	64.85	512.8
1/76/0	2937.90	118	346.67	213.74	8965.66	12	107.59	66.33	525.1
1/77/0	2937.90	118	346.67	213.74	8965.66	12	107.59	66.33	525.1
1/85/0	2979.64	132	393.31	242.49	9965.66	12	119.59	73.73	592.9
1/86/0	3021.37	132	398.82	245.89	10065.66	12	120.79	74.47	598.8
1/87/0	3083.98	138	425.59	262.39	10465.66	12	125.59	77.43	626.7
2/22/0	2144.92	66	141.56	87.28	5105.66	12	61.27	37.77	267.1
2/23/0	2144.92	68	145.85	89.92	5165.66	12	61.99	38.22	270.5
2/32/0	2249.26	94	211.43	130.35	7165.66	12	85.99	53.01	372.1
2/33/0	2290.99	96	219.94	135.60	7255.66	12	87.07	53.68	379.5
3/22/0	2082.31	98	204.07	125.82	7405.66	12	88.87	54.79	370.0
3/33/0	2249.26	142	319.39	196.92	10805.66	12	129.67	79.95	547.4
App Slab	1936.24	92	178.13	109.83	3565.66	24	85.58	52.76	340.7

TABLE: BAR BENDING SCHEDULE FOR APPROACH SLAB

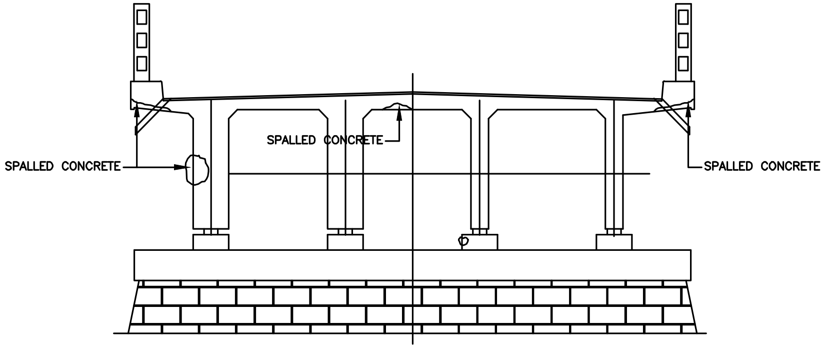
BAR MKD.– ⓐ1 12 Φ @150c/c (200 / 3400 / 200) LENGTH l (mm)	NOS.	TOTAL LENGTH (m)	WEIGHT (kg)	BAR MKD.– ⓐ2 12 Φ @150c/c (200 / 10800 / 200) LENGTH (mm)	NOS. n=2xnp	TOTAL LENGTH lxn (m)	WEIGHT w1 (kg)	BAR MKD.– ⓐ3 12 Φ @150c/c (200 / 5402 / 5402 / 200) LENGTH l (mm)	NOS.	TOTAL LENGTH (m)	WEIGHT (kg)	TOTAL WEIGHT (kg)
3758.8	292	1097.57	974.44	11159	46	513.30	455.72	11162.8	46	513.49	455.88	1886.04

NOTES:–

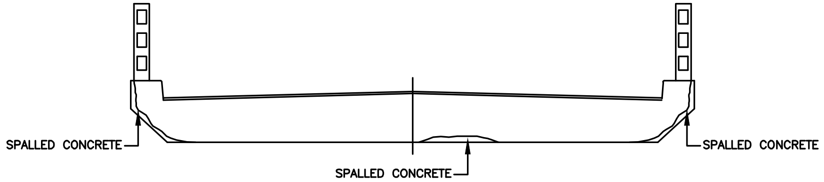
1. FOR GENERAL NOTES REFER DWG. NO. PPWCS/GEN/101
2. THIS DRAWING SHALL BE READ IN CONJUNCTION TO DWG. NO. PPWCS/BOX/DD/18 (SHEET 1&2 OF 3)

DETAIL OF R.C.C. RAILING

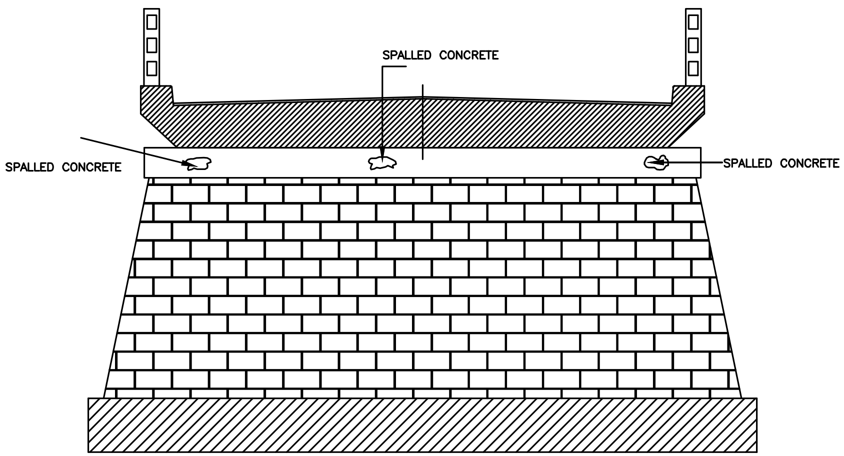
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



TYPICAL SECTION SHOWING SPALLED OUT COCRETE IN RCC T-BEAM DECK SLAB

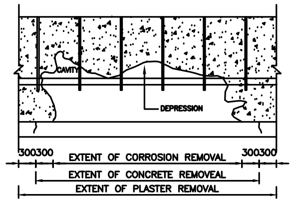


TYPICAL SECTION SHOWING SPALLED OUT CONC IN RCC SOLID SLAB

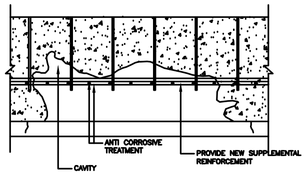


TYPICAL SECTION SHOWING OUT CONC. IN RCC PIER CAP

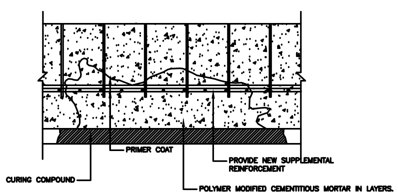
STEP 1 PREPARATION OF BASE



STEP 2 PROVIDING REINFORCEMENT



STEP 3 APPLYING PLOYMER MODIFIED CEMENTITIOUS MORTAR



Step-1

1. Demarcate the damaged area
2. Remove plaster cover or coating. If any
3. Remove all loose concrete and expose rusted reinforcement
4. Identify extent of corrosion of reinforcement and remove concrete 300mm beyond rusted length and remove plaster 600mm beyond rusted length.
5. Cut edges of concrete base neat and square and in rectilinear pattern.
6. Hack back to sound concrete and roughen exposed concrete.
7. Clean spalled concrete with filtered compressed air.

Step-2

1. Cut and remove any severely corroded and detached reinforcement.
2. Clean remaining reinforcement with the help of specified anticorrosive treatment.
3. Provide and anchor new supplemental reinforcement and/or wire mesh as required.

Step-3

1. Primer slurry coat shall be applied with the help of stiff nylon bristle brush on spalled out surface.
2. Before the primer coat is fully cured. Polymer modified cementations mortar shall be applied by means of trowels and floats.
3. The interval between the application of primer coat and pmc mortar shall be 15 to 30 minutes depending upon the ambiet temperature.
4. The total thickness of PMC mortor shall be applied in multiple layers of thickness 25mm or manufacture's recommendations by trowel.
5. Repaired surface shall be matched with original existing surface and curing be carried out by curing compound.

DETAIL OF C.C. CRACK REPAIR

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RAJKOT

EXECUTIVE ENGINEER
STATE ROAD PROJECT DIVISION
RAJKOT

SCALE :
NOT TO SCALE

STATE ROAD PROJECT DIVISION
RAJKOT

GOVERNMENT OF GUJARAT
ROADS AND BUILDINGS DEPARTMENT

SAVARKUNDLA – DHASA ROAD SH 021 & 236
ROAD MAINTENANCE PROGRAMME

DATE: PROJECT: DWG No: REV.

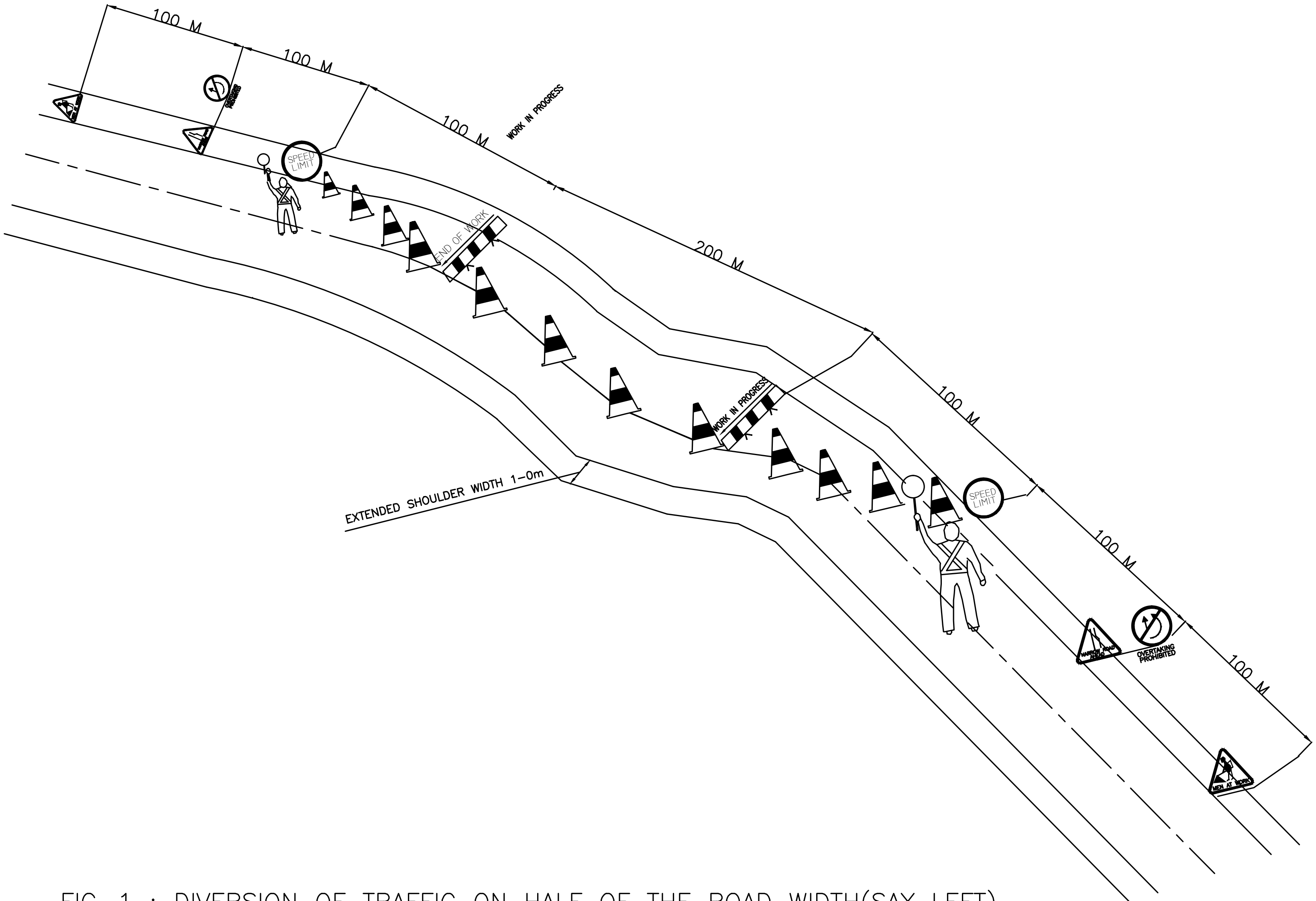
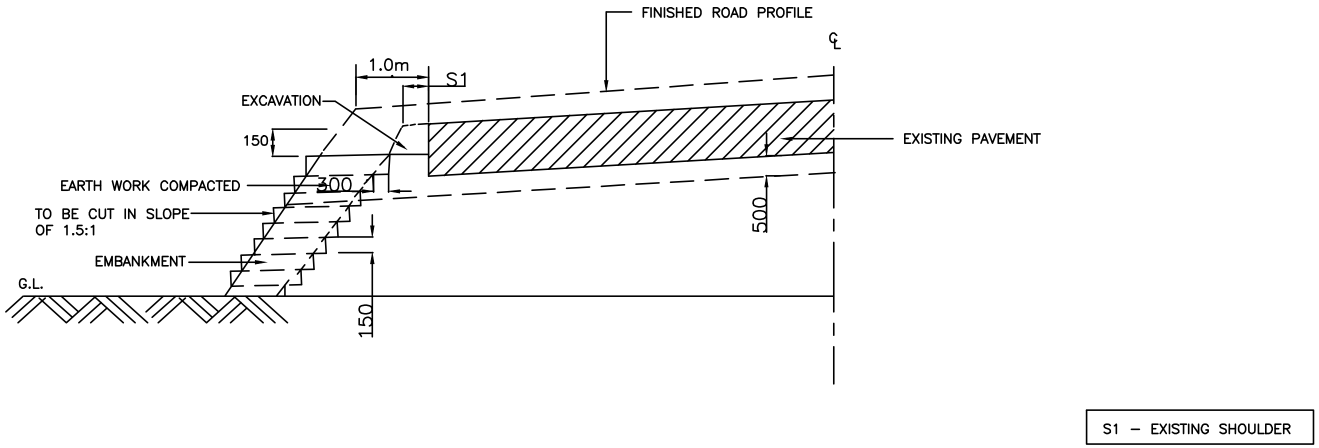
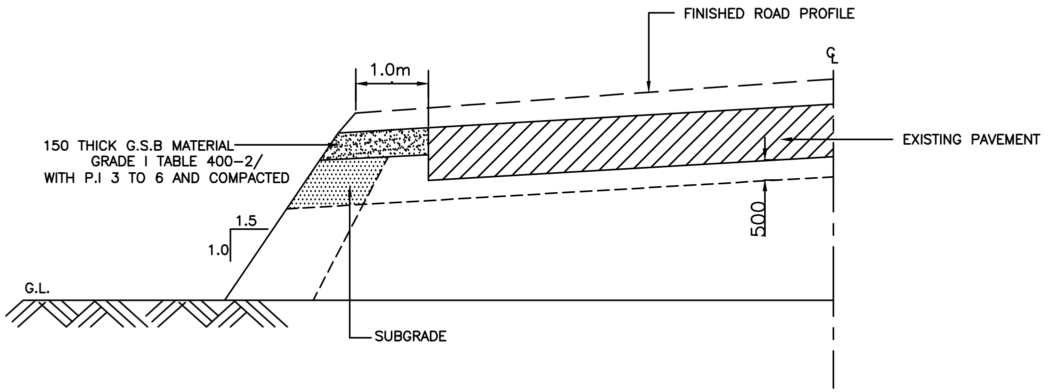


FIG-1 : DIVERSION OF TRAFFIC ON HALF OF THE ROAD WIDTH(SAY LEFT)

DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.

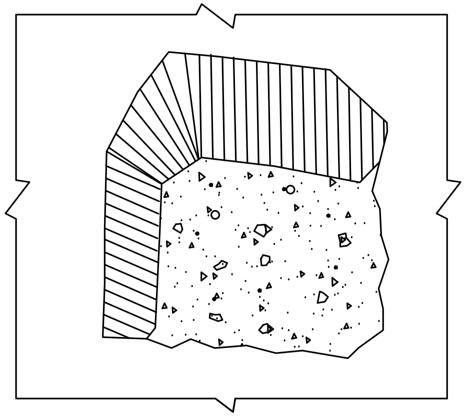


FIG–II : EXCAVATION AND EXTENSION OF SHOULDER

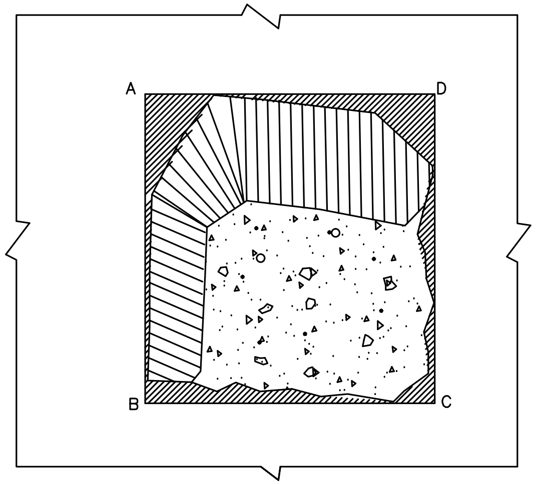


FIG–2 : FILLING OF G.S.B MATERIAL ON SHOULDER

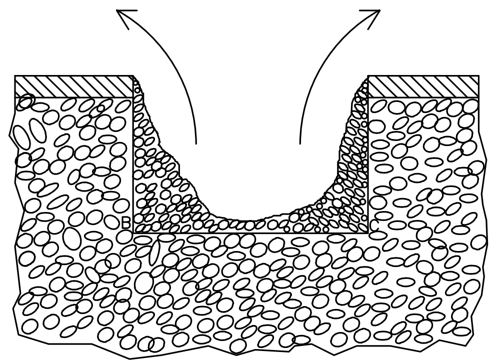
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



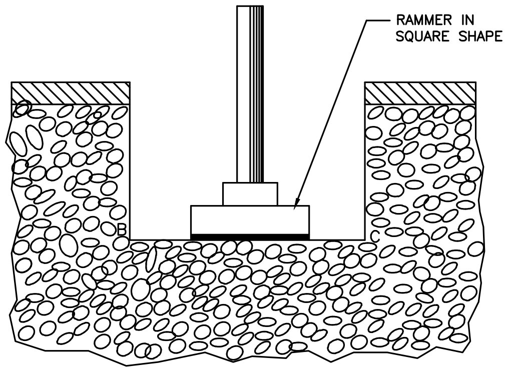
FIG–A : IDENTIFICATION



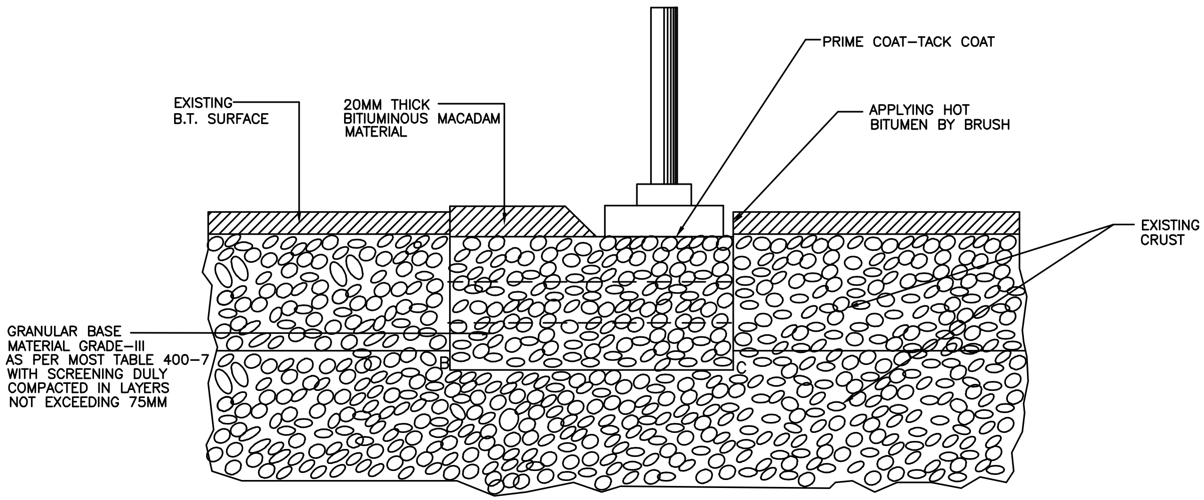
FIG–B : ABCD–MARKED AREA TO BE CUT/TRIMMED



FIG–C : EXCAVATING/CUTTING OF MARKED AREA



FIG–D : CUT/TRIM AND COMPACTED



FIG–E : BACKFILLING AND COMPACTING THE HOLE

FIG–3 : DEEP POT HOLE/DEPRESSION REPAIR (AREA LESS THAN 1 SQ–M AND DEPTH > 75MM)

DEPUTY EXECUTIVE ENGINEER
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STATE ROAD PROJECT DIVISION
RAJKOT

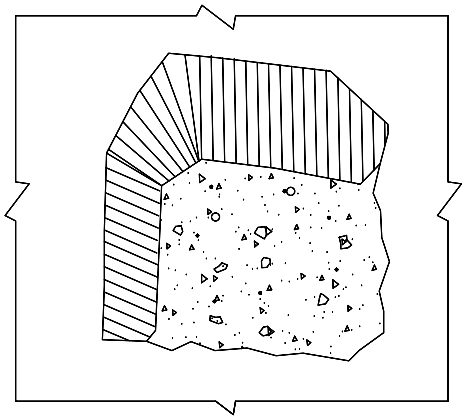
SCALE :
NOT TO SCALE

STATE ROAD PROJECT DIVISION
RAJKOT

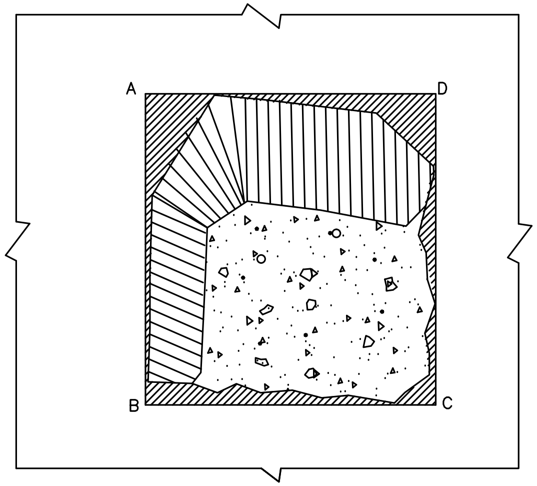
GOVERNMENT OF GUJARAT
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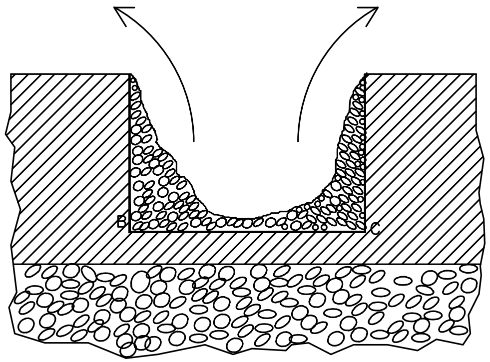
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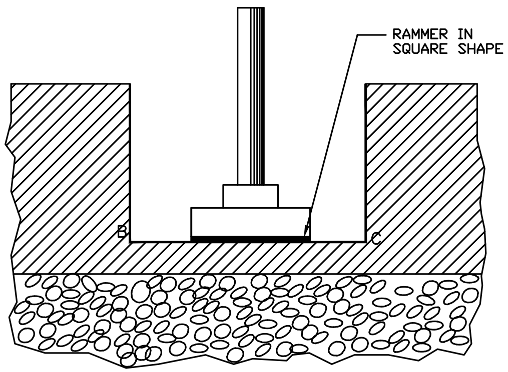
FIG–A : IDENTIFICATION



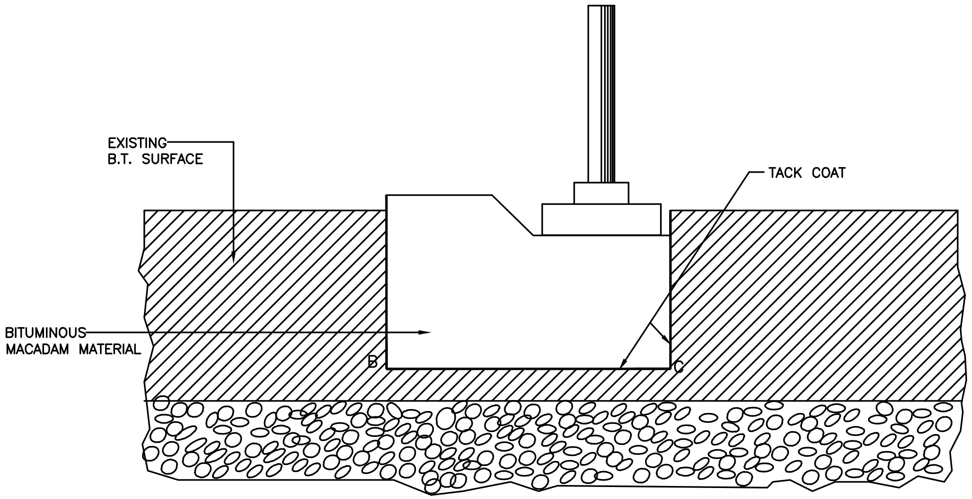
FIG–B : ABCD–MARKED AREA TO BE CUT/TRIMMED



FIG–C : EXCAVATING/CUTTING OF MARKED AREA



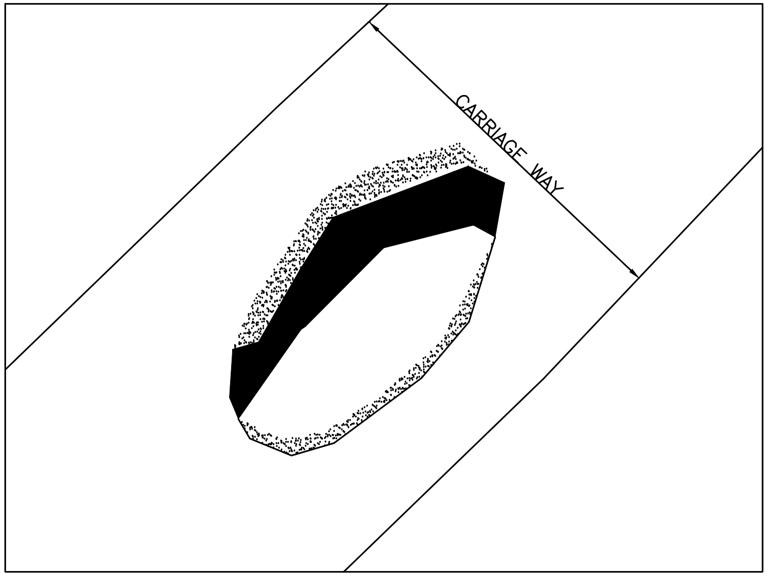
FIG–D : CUT/TRIM AND COMPACTED



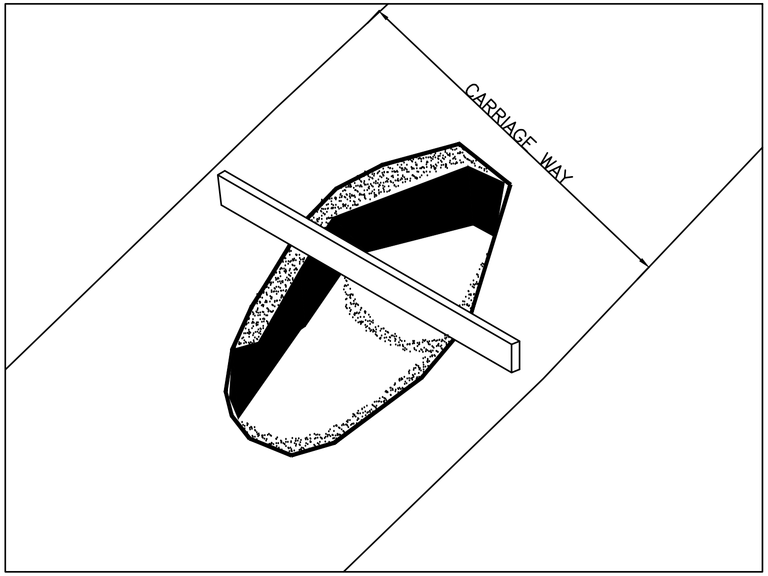
FIG–E : FILLING WITH B.M MATERIAL AND COMPACTED

FIG–4 : SHALLOW POT HOLE REPAIR LESS THAN 75MM IN DEPTH

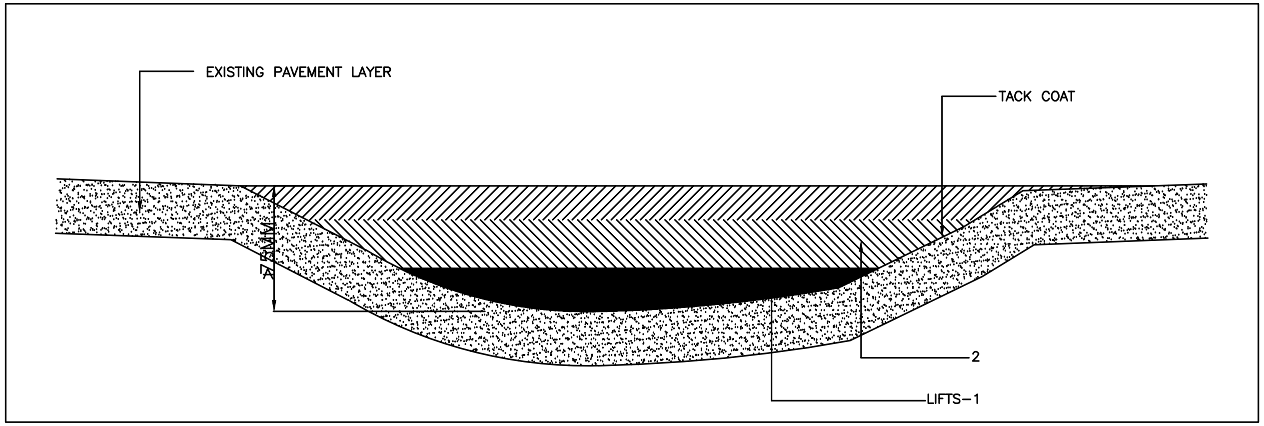
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



IDENTIFICATION



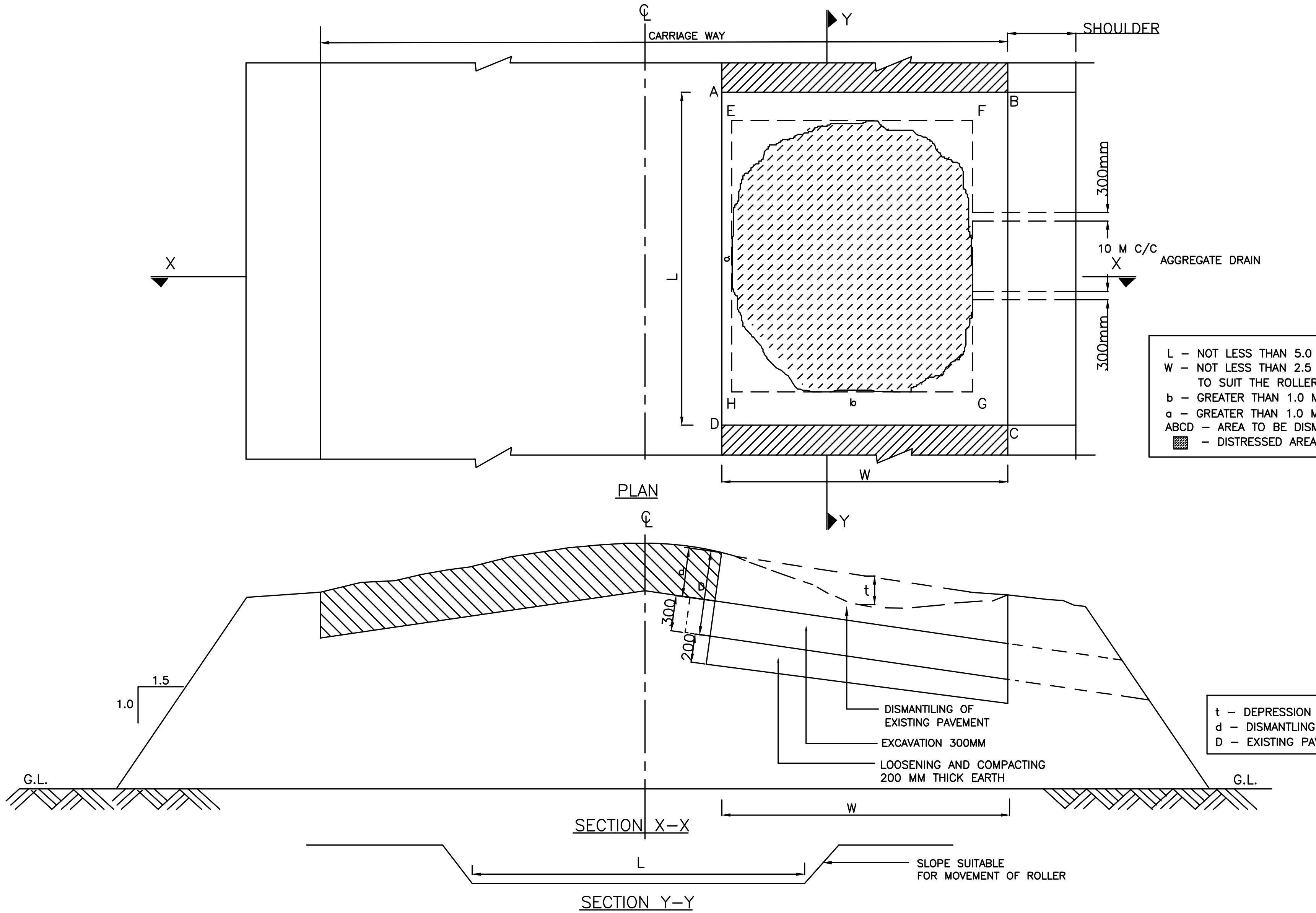
MARKING OUT AREA



FILLING WITH B.M MATERIAL AND COMPACTED

FIG-5 : PREPARATORY/REPAIR WORK FOR DEPRESSION LESS THAN 75MM

DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.

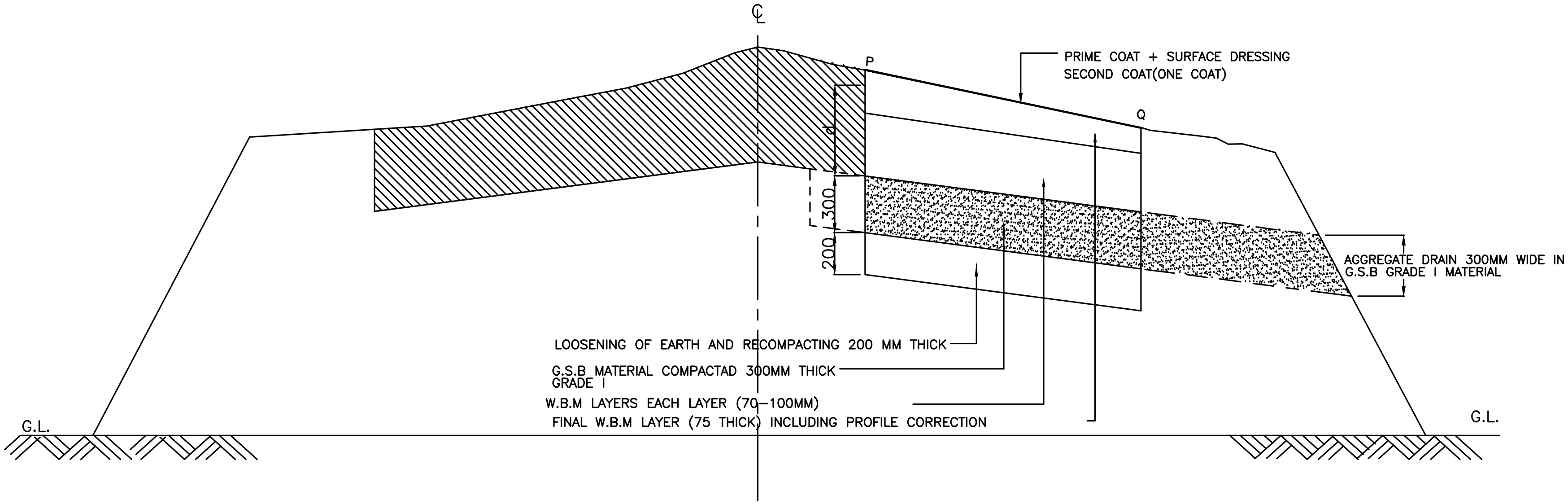


L – NOT LESS THAN 5.0 M
W – NOT LESS THAN 2.5 M (ADEQUATE WIDTH TO SUIT THE ROLLER WHEEL)
b – GREATER THAN 1.0 M
a – GREATER THAN 1.0 M
ABCD – AREA TO BE DISMANTLED
▨ – DISTRESSED AREA > 1 SQ–M

t – DEPRESSION MORE THAN 75MM
d – DISMANTLING OF EXISTING PAVEMENT
D – EXISTING PAVEMENT + 300MM DEPTH

(FIG–6 : CROSS SECTION OF DEPRESSION MORE THAN 75MM DEPTH FOR FULL DEPTH REPAIR

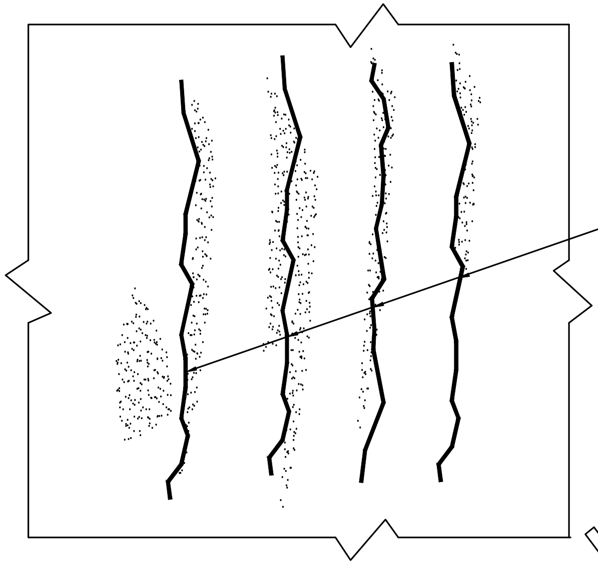
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



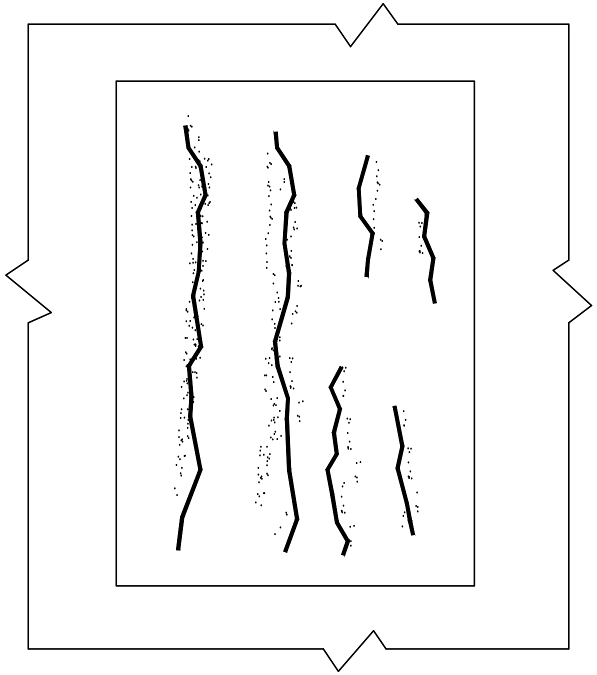
d – DEPTH OF EXISTING PAVEMENT

(FIG– 7 : TREATMENT FOR FULL DEPTH REPAIR)

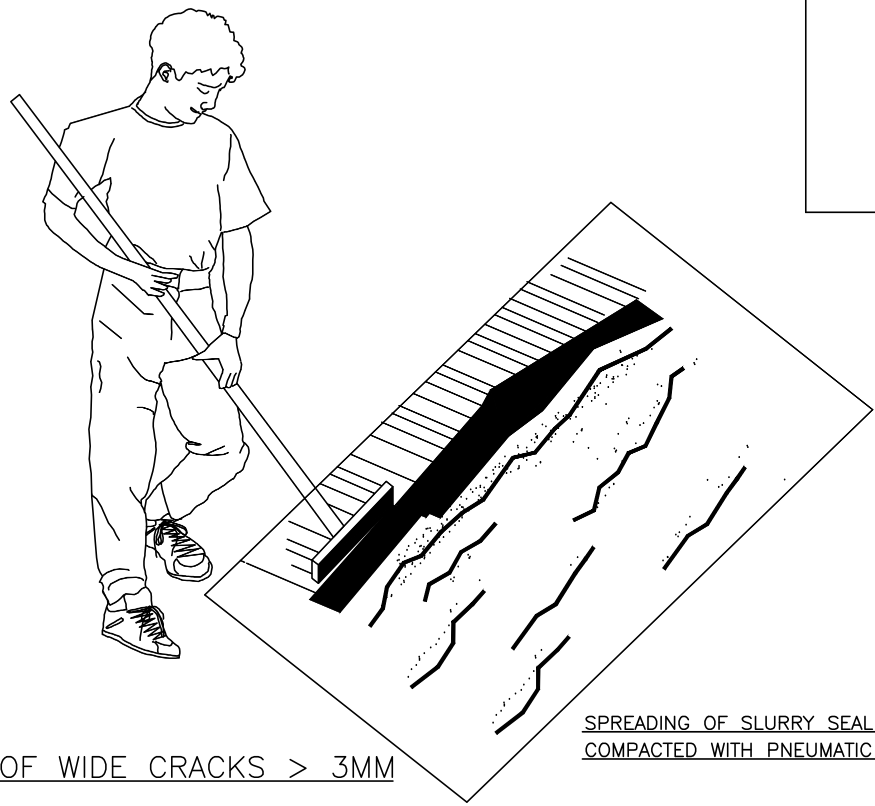
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



IDENTIFICATION OF CRACKS



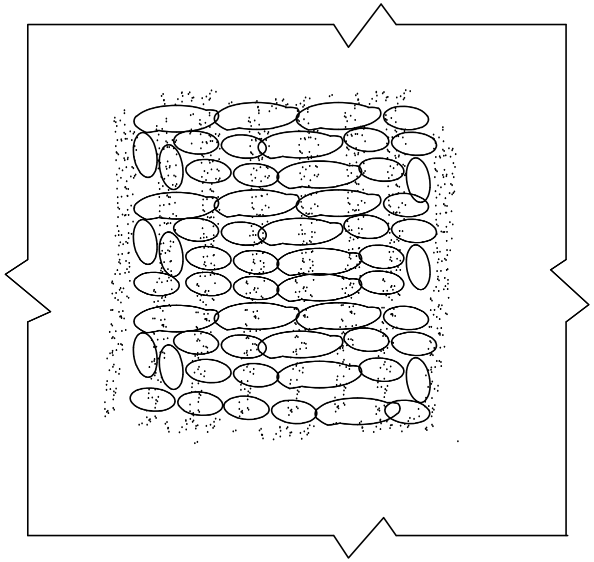
MARKING OUT/CLEANING THE CRACKED AREA



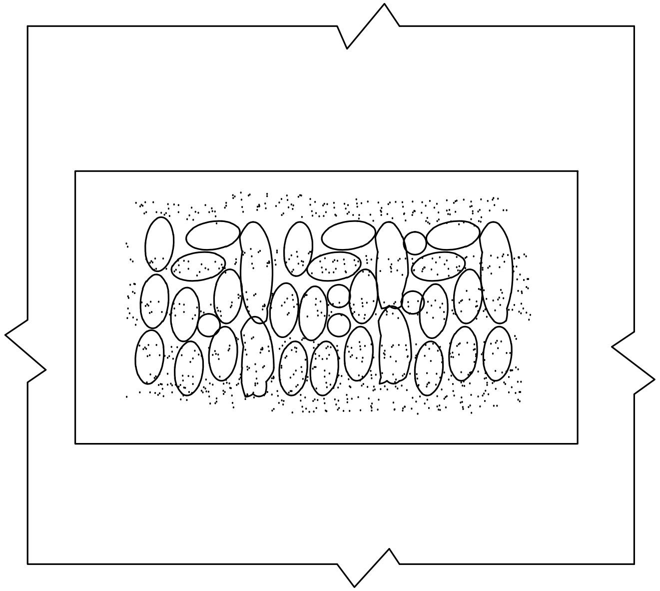
SPREADING OF SLURRY SEAL BY MANUAL MEANS AND COMPACTED WITH PNEUMATIC TYRED ROLLER

FIG – 8 SEALING OF WIDE CRACKS > 3MM

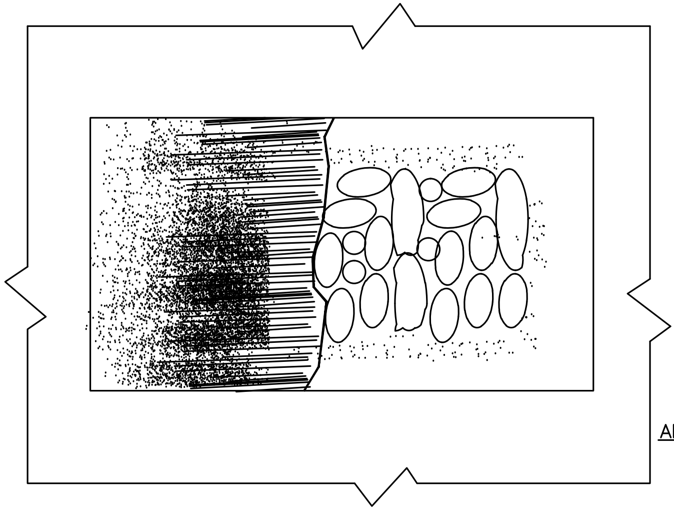
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



IDENTIFICATION OF FINE CRACKS (ALIGATOR/TRANSVERSE/ LONGITUDINAL/SHRINKAGE)



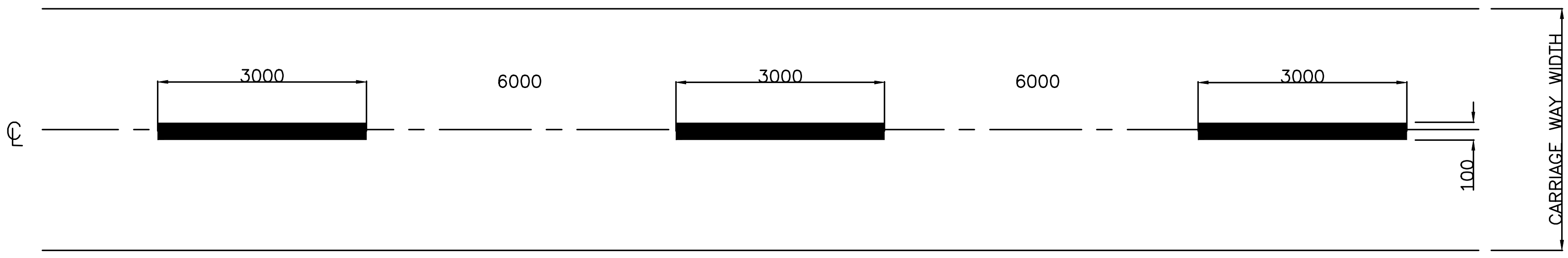
MARKING OUT THE AREA AND SWEPT/CLEANING



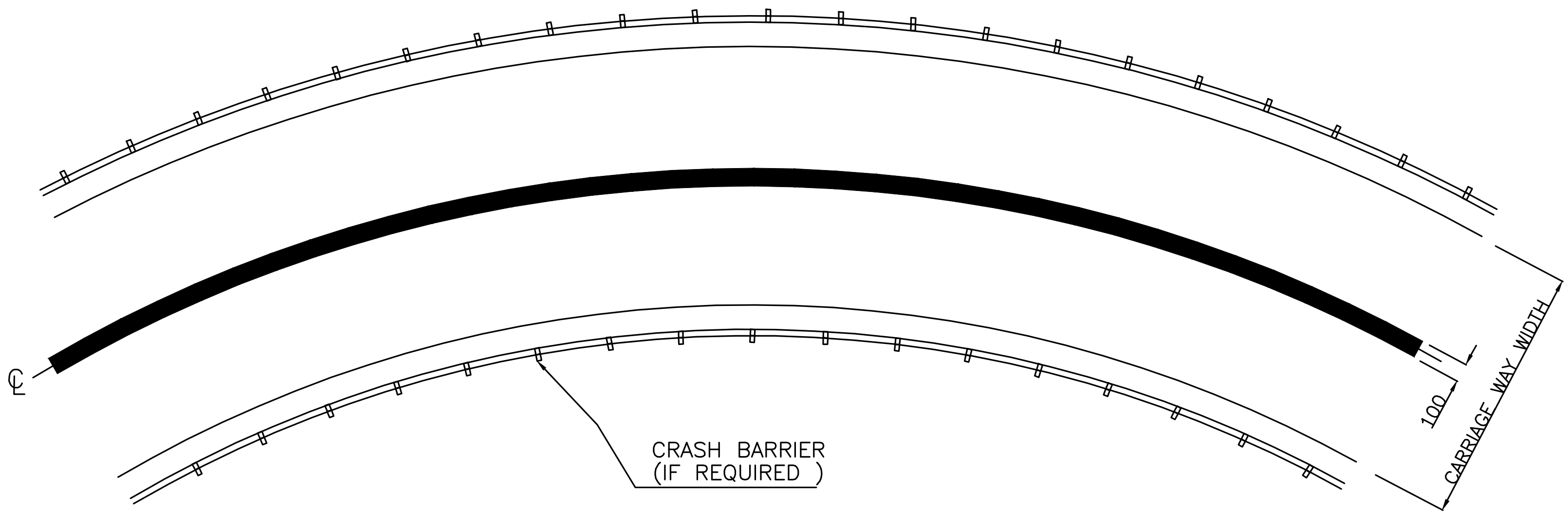
APPLYING FOG SEAL AT THE RATE OF 0.5 TO 1.0 LIT/SQ-M USING PRESSURE TANK,SPRAYING BAR AND FLEXIBLE HOSE

FIG – 9 SEALING OF FINE/NARROW CRACKS < 3MM

DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



FIG–XA : CENTRE LINE MARKING FOR TWO LANE ROAD ON STRAIGHT ALIGNMENT



FIG–10 : CENTRE LINE MARKING FOR TWO LANE ROAD ON HORIZONTAL CURVE

DEPUTY EXECUTIVE ENGINEER
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RAJKOT

EXECUTIVE ENGINEER
STATE ROAD PROJECT DIVISION
RAJKOT

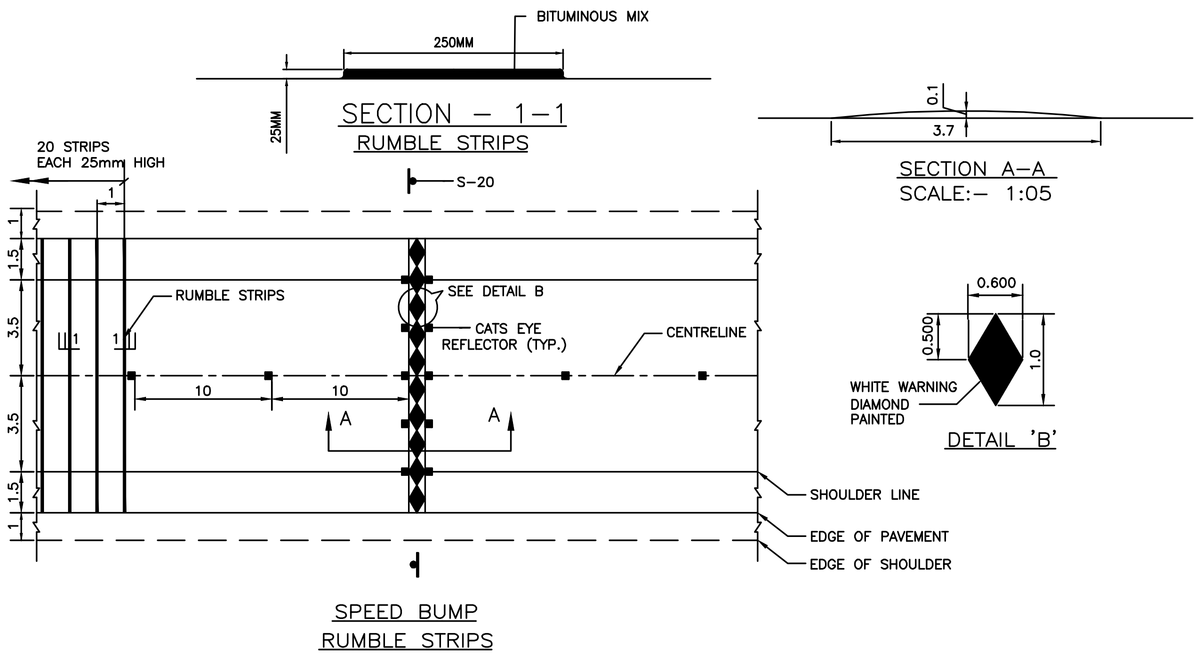
SCALE :
NOT TO SCALE

STATE ROAD PROJECT DIVISION
RAJKOT

GOVERNMENT OF GUJARAT
ROADS AND BUILDINGS DEPARTMENT

SAVARKUNDLA – DHASA ROAD SH 021 & 236
ROAD MAINTENANCE PROGRAMME

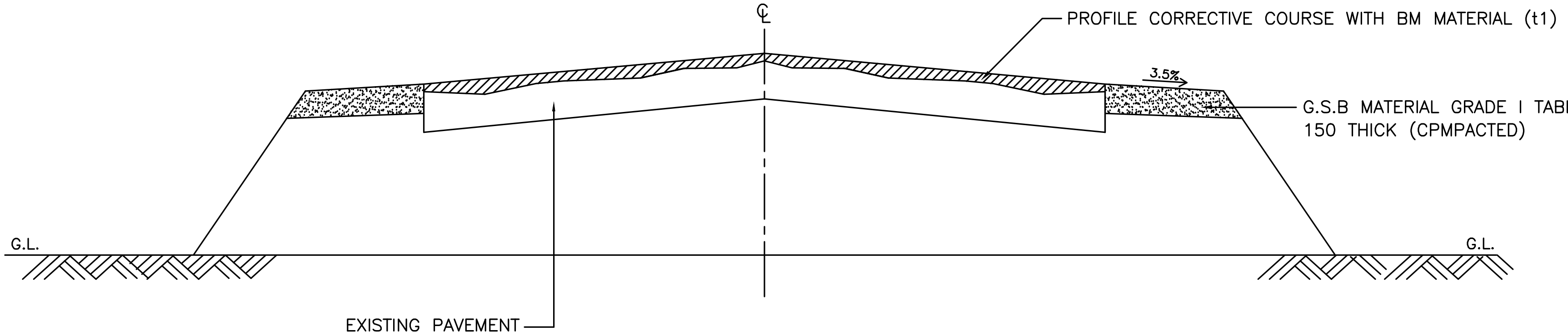
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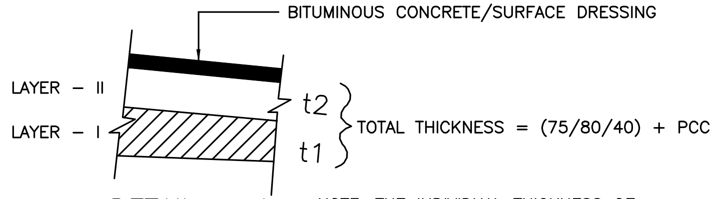
NOTES:
1. ALL DIMENSIONS ARE IN METER UNLESS OTHERWISE SPECIFIED.
2. SHOULDER WITH VARIES AS PER TYPICAL SECTIONS.

FIG – 11

DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.

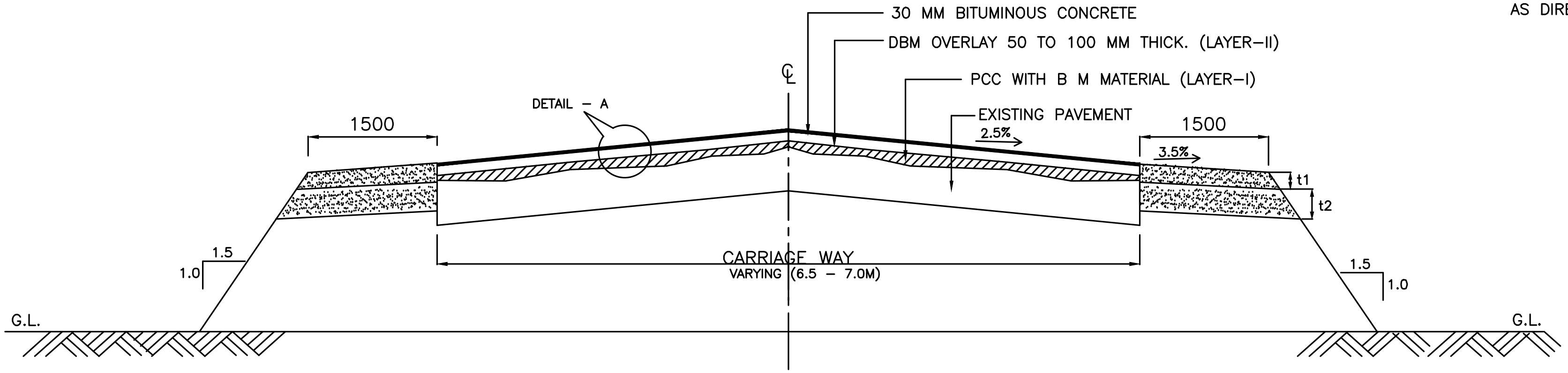


(FIG–VIII : PROFILE CORRECTIVE COURSE)



DETAIL – A

NOTE: THE INDIVIDUAL THICKNESS OF LAYER t1 & t2 SHALL BE AS DIRECTED BY THE ENGINEER

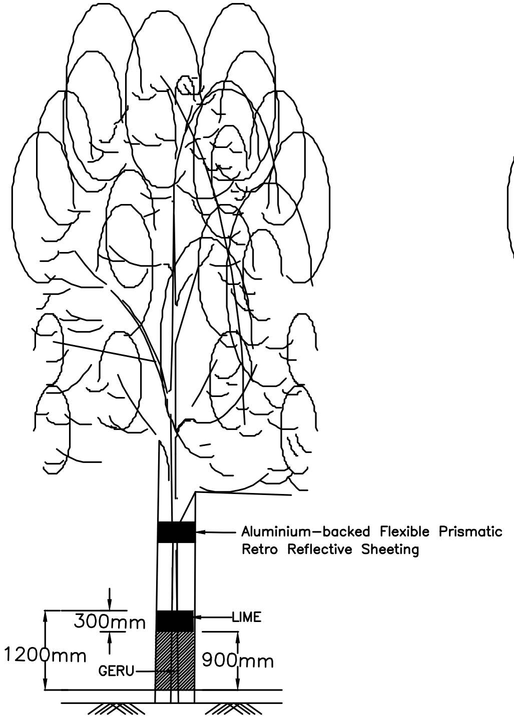


t1 – 50 TO 95MM THICK G.S.B MATERIAL GRADE II
MOST TABLE 400–2 WITH P.I 3 – 8 COMPACTED

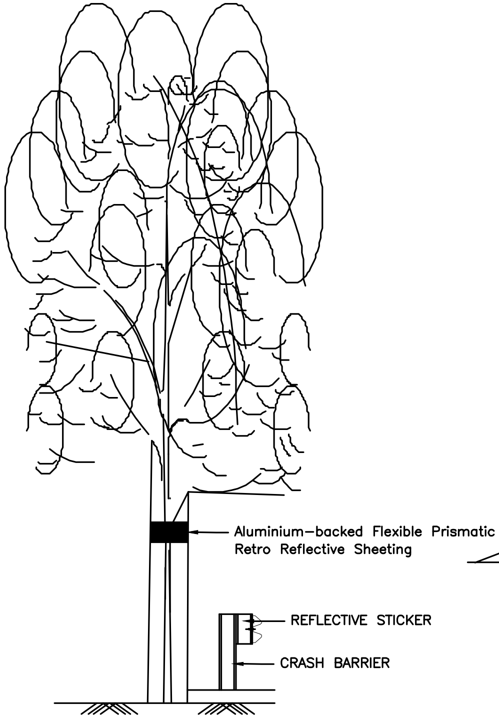
t2 – 150MM THICK G.S.B MATERIAL GRADE I
MOST TABLE 400–2 WITH P.I 3 – 8 COMPACTED

(FIG–12 : PROPOSED BITUMINOUS WORK/TREATMENTS)

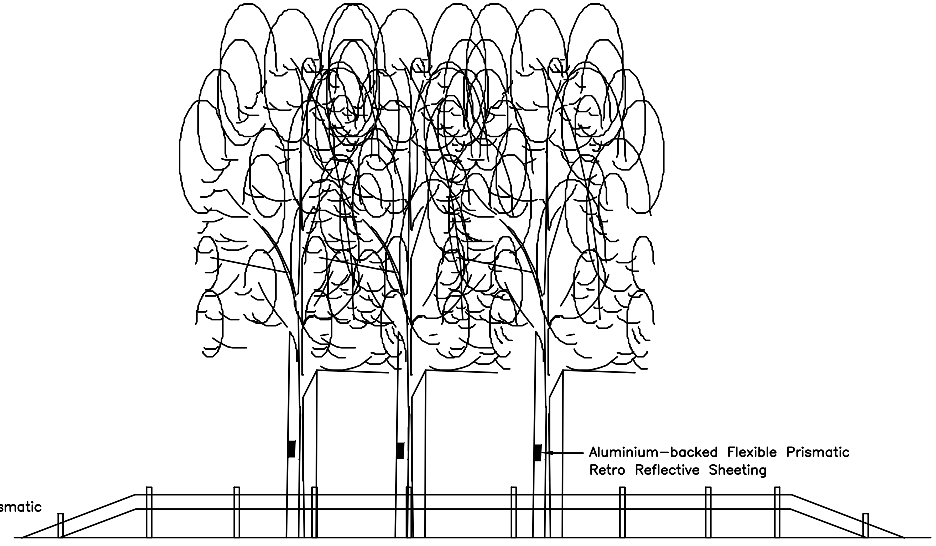
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



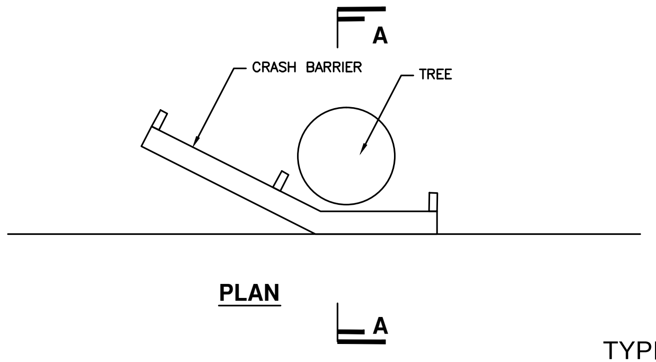
GERU MARKING ON TREE



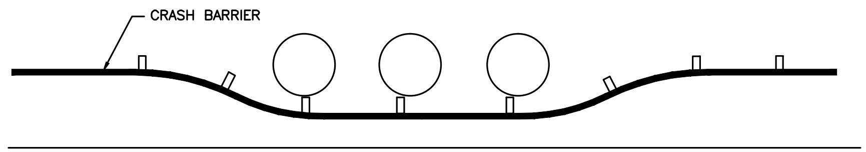
TREE GUARD SECTION -A A



SIDE VIEW



PLAN



PLAN

TYPICAL DETAIL OF TREE GUARD

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RAJKOT

EXECUTIVE ENGINEER
STATE ROAD PROJECT DIVISION
RAJKOT

SCALE : NOT TO SCALE

STATE ROAD PROJECT DIVISION
RAJKOT

GOVERNMENT OF GUJARAT
ROADS AND BUILDINGS DEPARTMENT

SAVARKUNDLA – DHASA ROAD SH 021 & 236
ROAD MAINTENANCE PROGRAMME

DATE: | PROJECT: | DWG No: | REV.

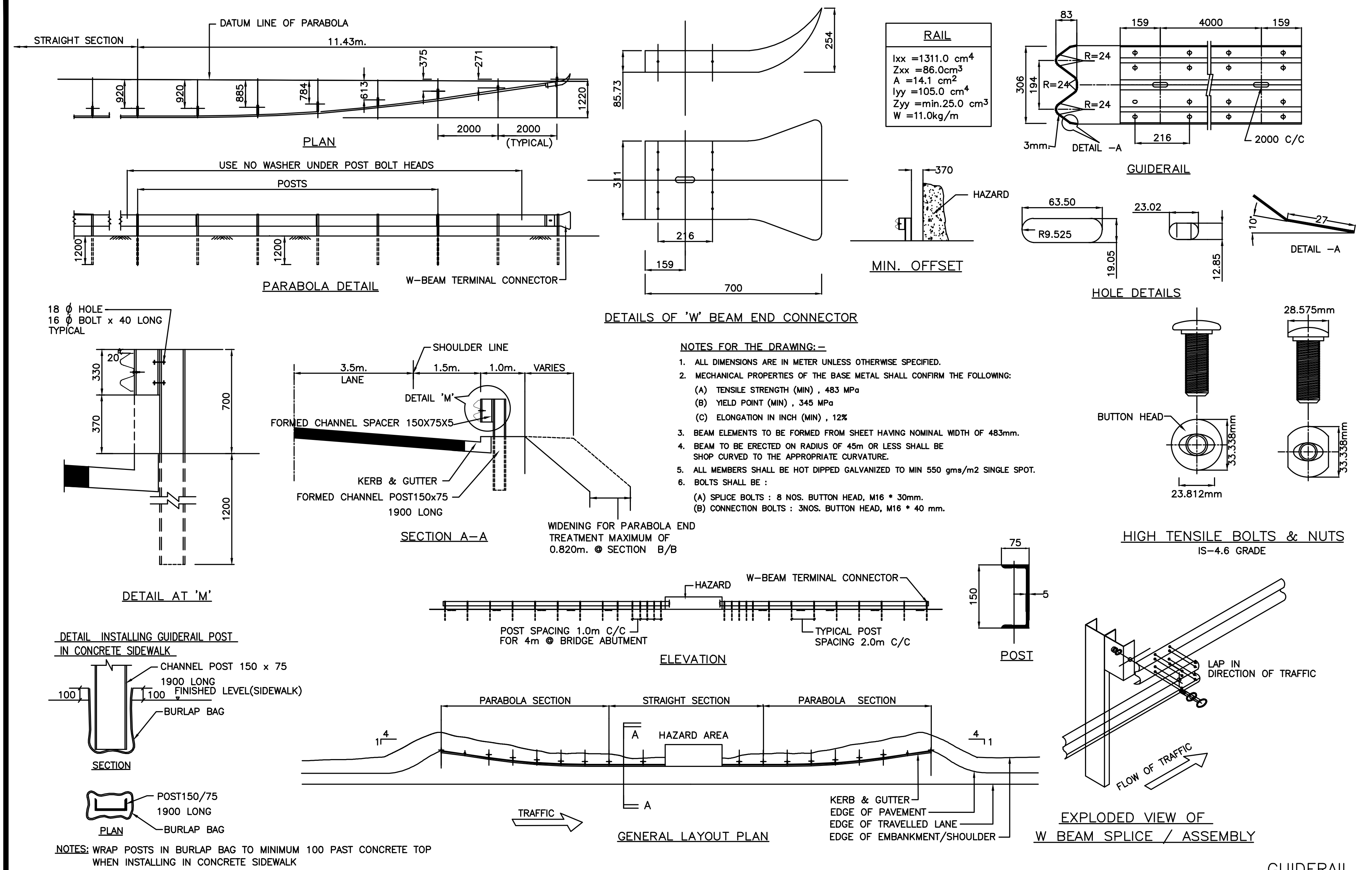
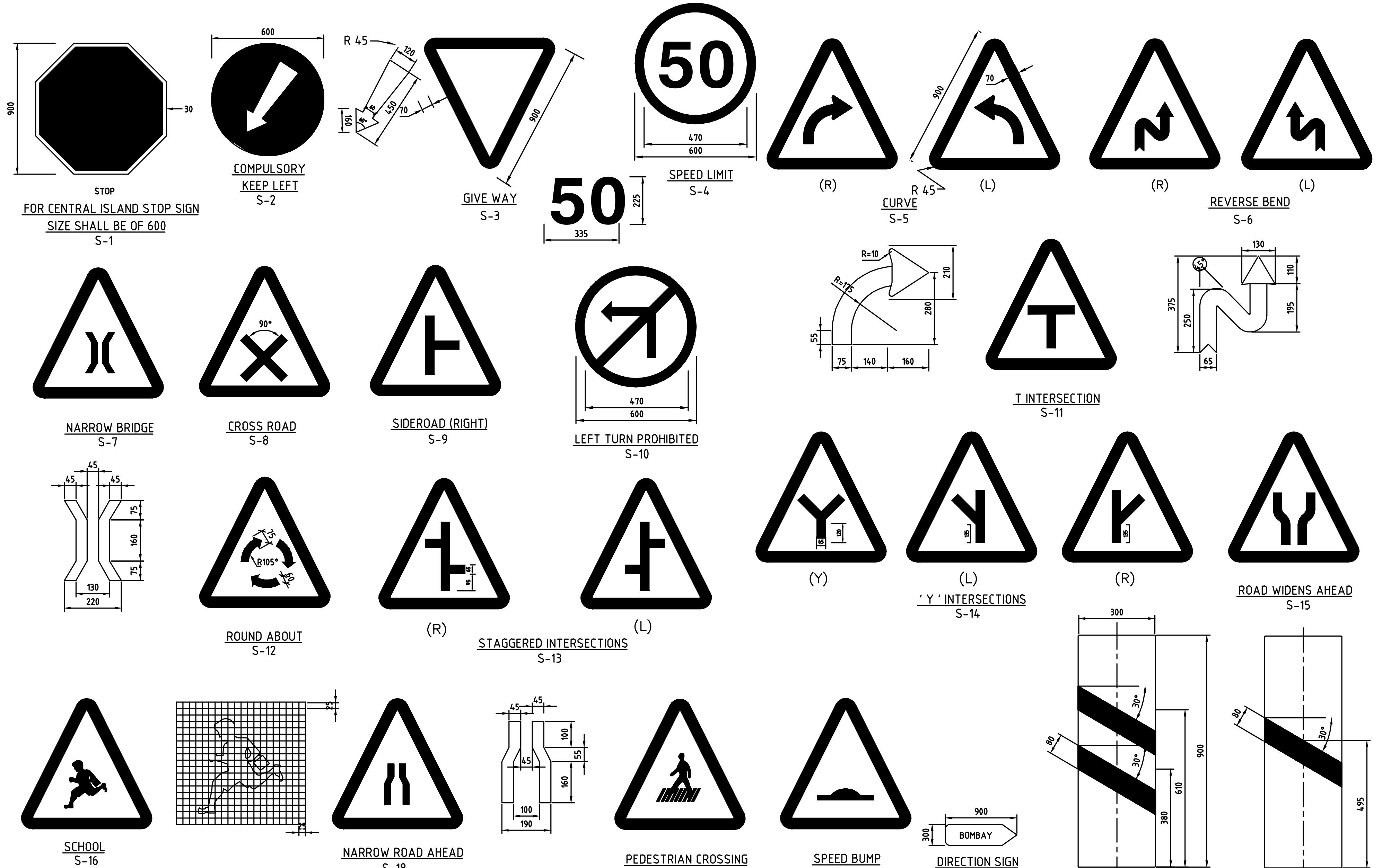


FIG-13

GUIDERAIL

DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA - DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.

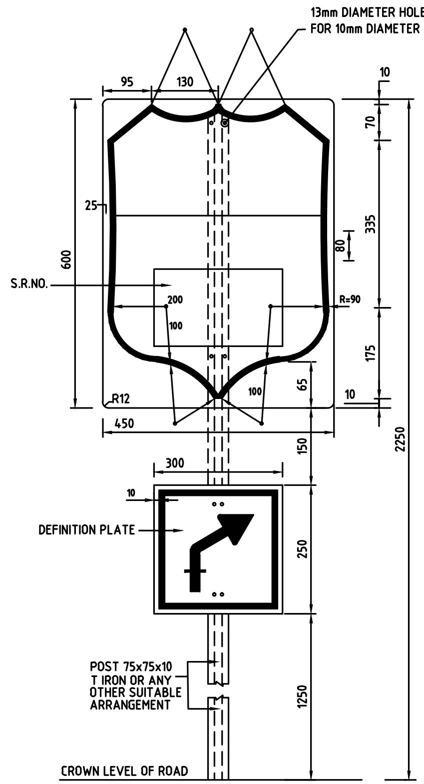


NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE SPECIFIED.

FIG-14

ROAD SIGNS-1

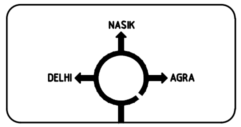
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



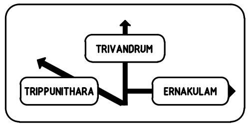
ASSEMBLY OF ROUTH MARKER SIGN

ARRANGEMENT FOR ERECTION OF STATE ROUTE MARKER SIGN

S-17
S-24

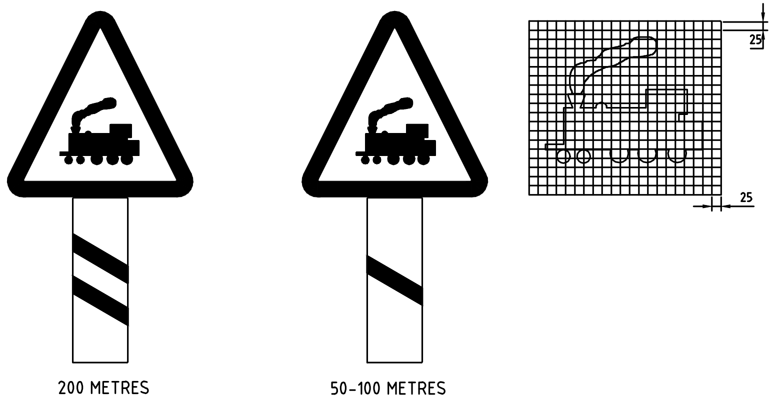


ADVANCE DIRECTON SIGN FOR ROTARY

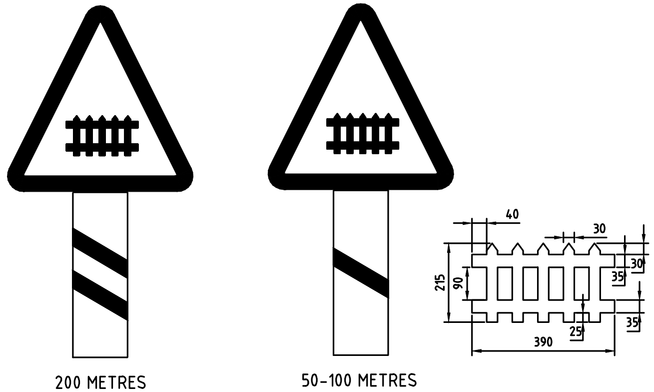


ADVANCE DIRECTON SIGN

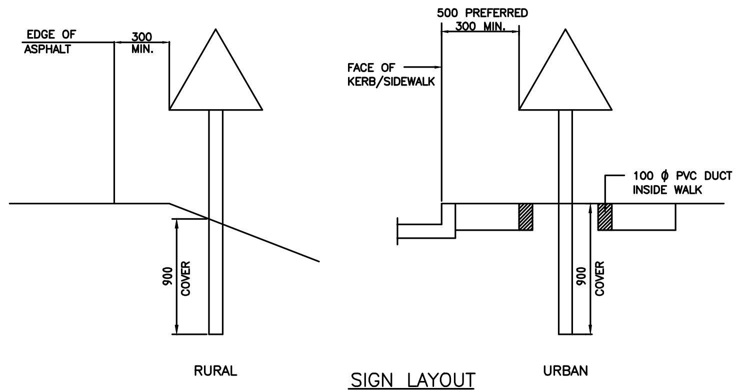
S-25



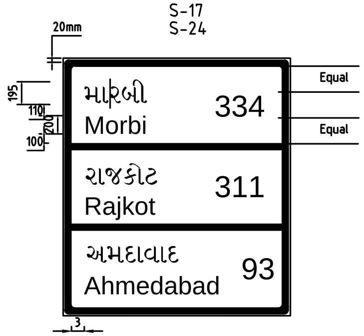
UNGUARDED RAILWAY CROSSING
S-26



GUARDED RAILWAY CROSSING
S-27



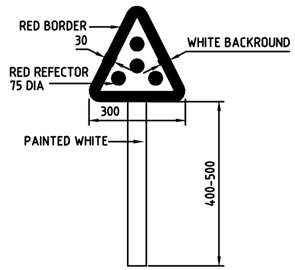
SIGN LAYOUT



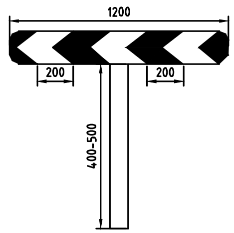
LAYOUT OF REASSURANCE SIGNS
S-28



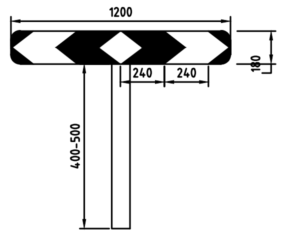
RUMBLE STRIP
S-29



CLUSTER OF RED REFECTORS
TA-1



ONE-WAY HAZARD MARKER
TA-2

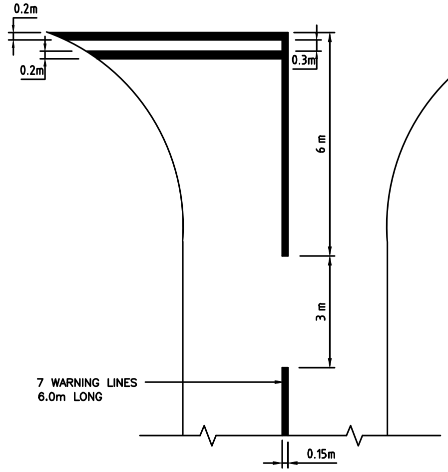


TWO-WAY HAZARD MARKER
TA-3

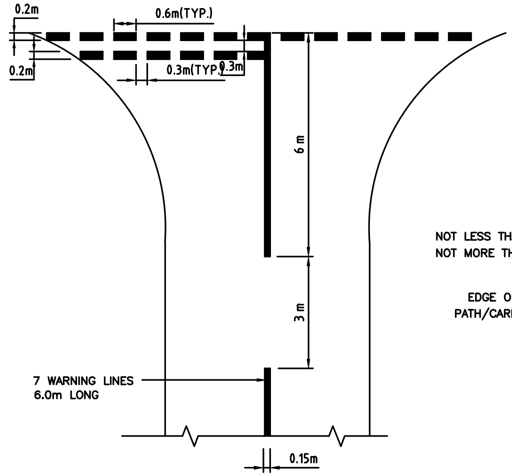
NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE SPECIFIED.

FIG-15 ROAD SIGNS-2

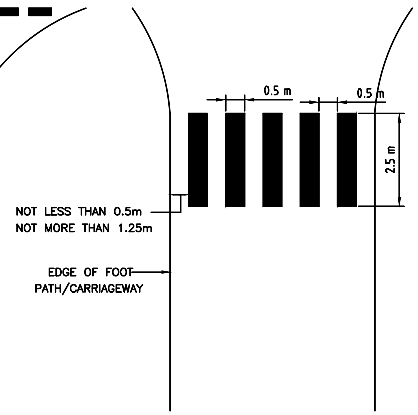
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



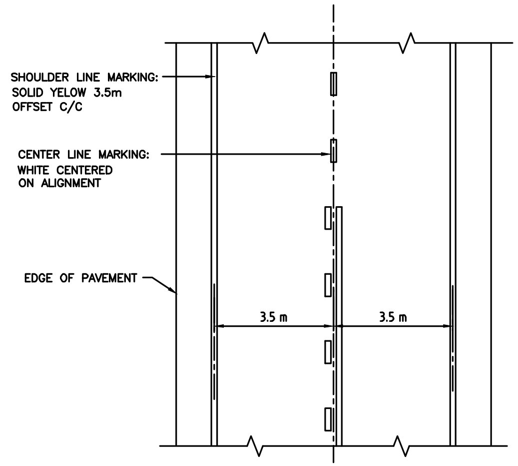
STOP LINE



YIELD LINE



PEDESTRIAN CROSSING MARKING



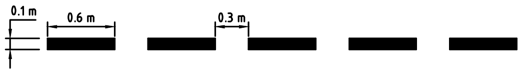
GENERAL LAYOUT



SOLID LANE MARKING



STANDARD LANE MARKING

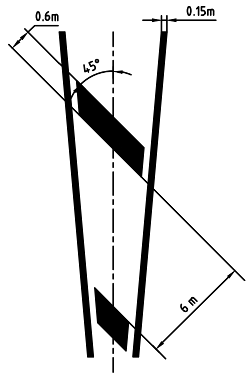


WARNING LANE MARKING

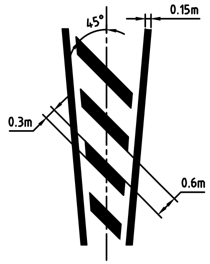


DOUBLE MARKING ARRANGEMENT

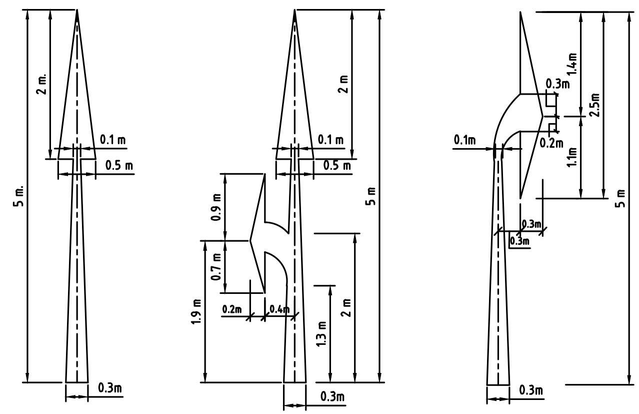
LANE MARKINGS



TYPE 1
GORE MARKING
OVER 20m.



TYPE 2
GORE MARKING
UNDER 20m.

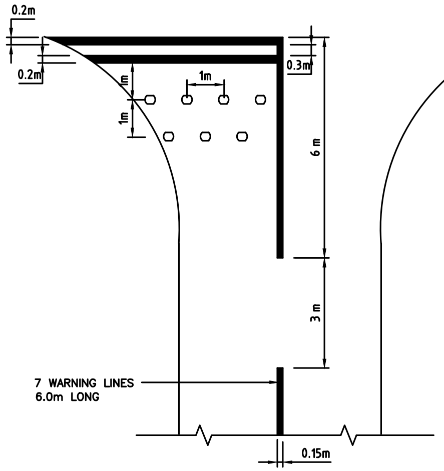


ARROW MARKING FOR ROUTE DIRECTION

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE SPECIFIED.

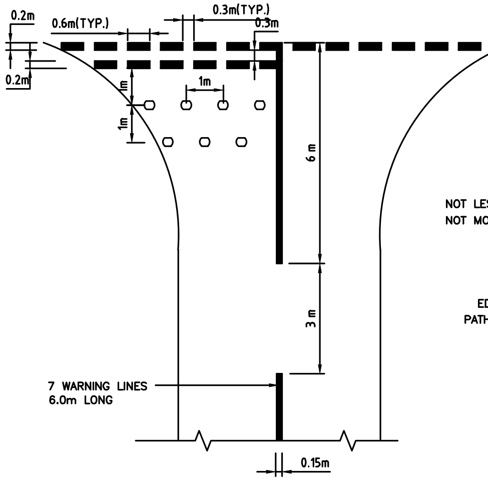
FIG-16 LANE MARKINGS

DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



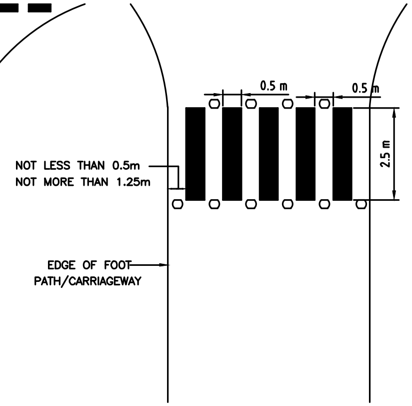
STOP LINE

RETRO – REFLECTIVE ROAD STUDS (RED)



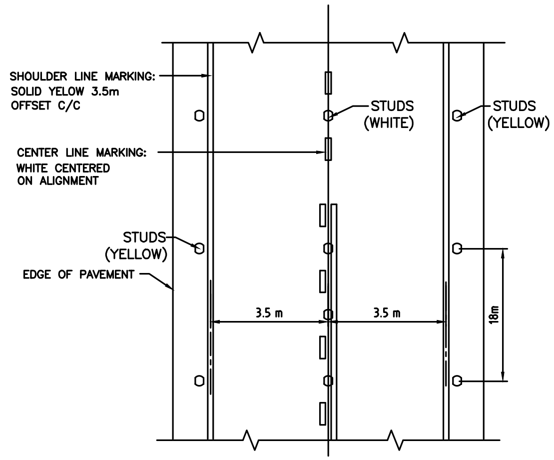
YIELD LINE

RETRO – REFLECTIVE ROAD STUDS (RED)



PEDESTRIAN CROSSING MARKING

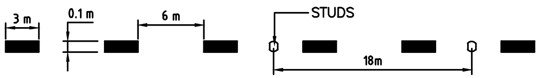
RETRO – REFLECTIVE ROAD STUDS (RED)



GENERAL LAYOUT

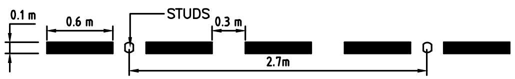


SOLID LANE MARKING

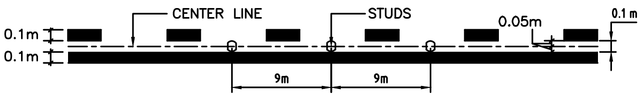


STANDARD LANE MARKING

RETRO – REFLECTIVE ROAD STUDS (WHITE)

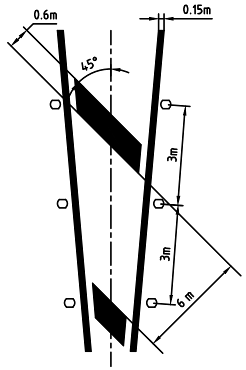


WARNING LANE MARKING



DOUBLE MARKING ARRANGEMENT

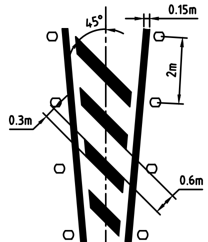
LANE MARKINGS



TYPE 1

GORE MARKING

OVER 20m.

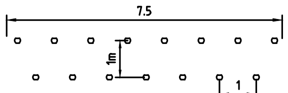


TYPE 2

GORE MARKING

UNDER 20m.

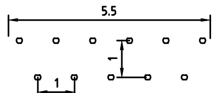
RETRO – REFLECTIVE ROAD STUDS (RED)



DETAIL –A

FOR 7.50m WIDTH (15NOS.)

RETRO – REFLECTIVE ROAD STUDS (RED)



DETAIL –A

FOR 5.50m WIDTH (11NOS.)

RETRO – REFLECTIVE ROAD STUDS (RED)

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE SPECIFIED.

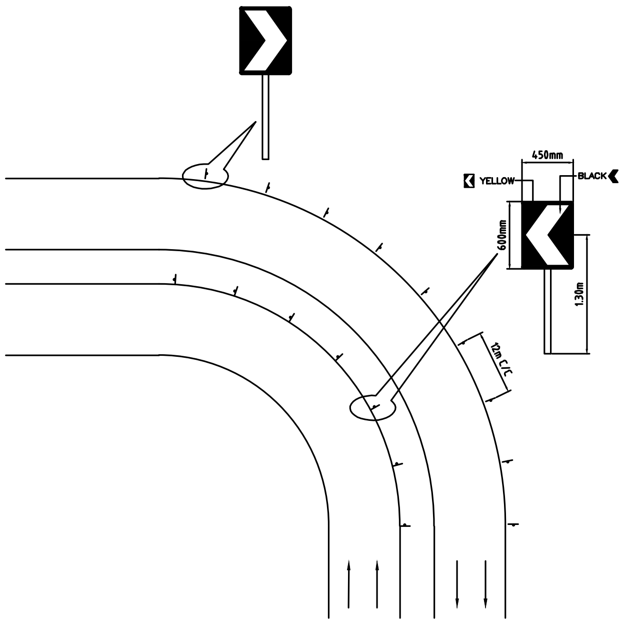
FIG–17

NIGHT TIME SAFETY (POSITION OF ROAD STUDS)

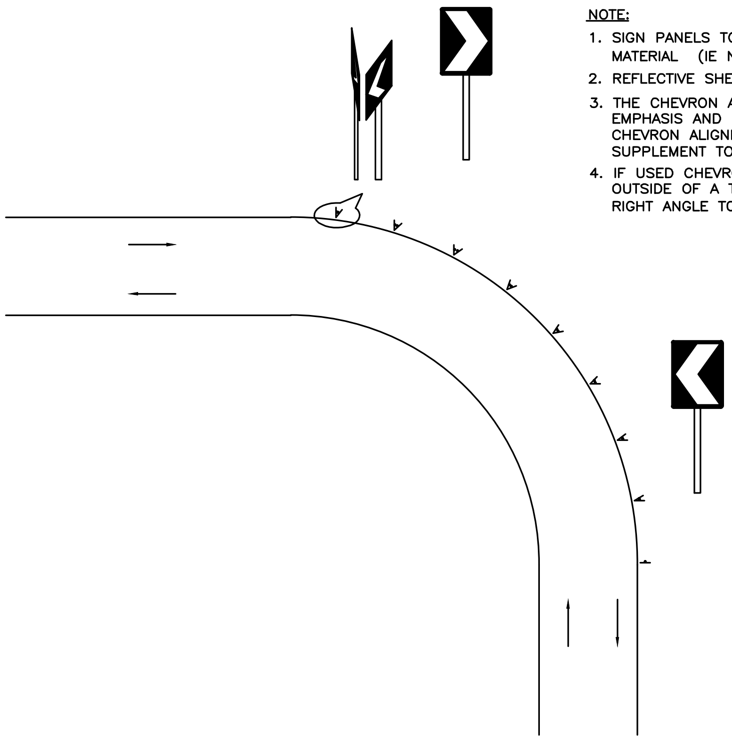
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.

NOTE:

1. SIGN PANELS TO BE MADE OF ALUMINUM COMPOSITE MATERIAL (IE NO. RE-SALE VALUE)
2. REFLECTIVE SHEETING – 3M OR APPROVED EQUAL
3. THE CHEVRON ALIGNMENT SIGN MAY BE USED TO PROVIDE ADDITIONAL EMPHASIS AND GUIDANCE FOR A CHANGE IN HORIZONTAL ALIGNMENT A CHEVRON ALIGNMENT SIGN MAY BE USED AS AN ALTERNATE OR SUPPLEMENT TO STANDARD DELINEATORS ON CURVES.
4. IF USED CHEVRON ALIGNMENT SIGNS SHALL BE INSTALLED ON THE OUTSIDE OF A TURN OR CURVE, IN LINE WITH AND AT APPROXIMATELY A RIGHT ANGLE TO APPROACHING TRAFFIC.



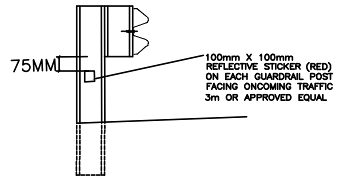
DUAL CARRIAGEWAY



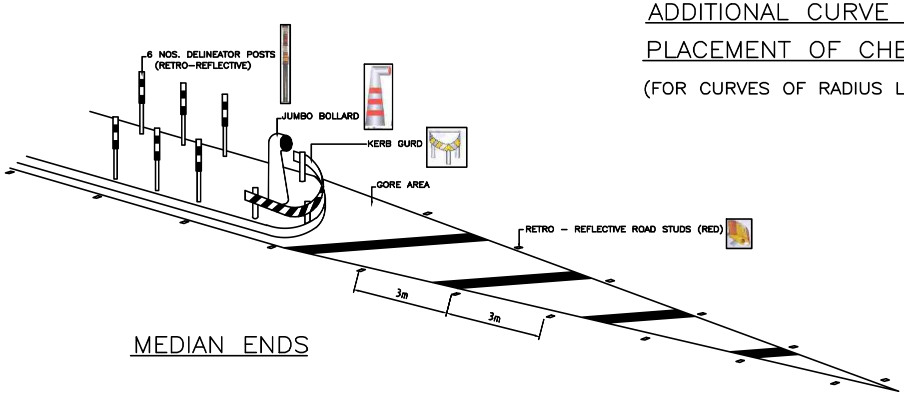
SINGLE CARRIAGEWAY

ADDITIONAL CURVE DELINEATION
PLACEMENT OF CHEVRON SIGNS

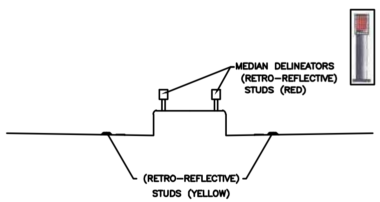
(FOR CURVES OF RADIUS LESS THAN 300M)



GUARDRAIL POST
FACING ON-COMING TRAFFIC



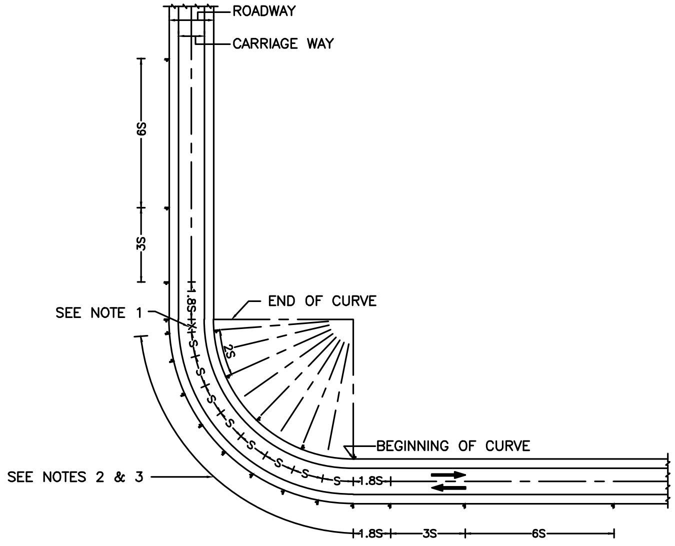
MEDIAN ENDS



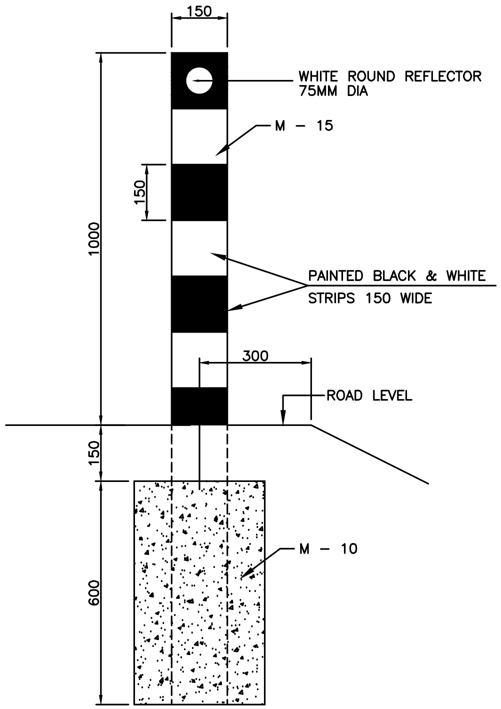
MEDIAN DELINEATION

TRAFFIC CONTROL AND SAFETY DEVICES
FIG-18

DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.

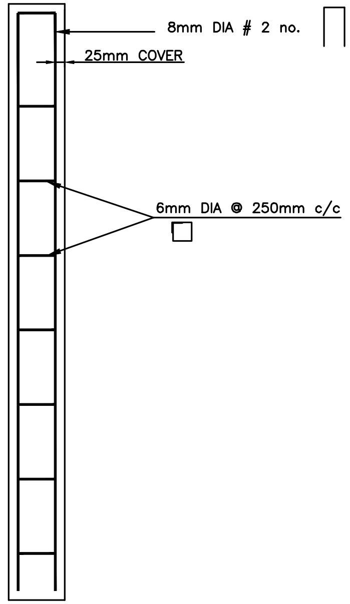


ROADWAY DELINEATOR SPACING ON CURVES

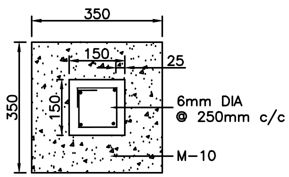


SECTION

DELINEATOR WITH CIRCULAR REFLECTOR



REINFORCEMENT DETAIL



PLAN

NOTES:–

1. ADJUST DISTANCE 'X' SUITABLY SO THAT THE LAST ROADWAY DELINEATOR IS AT THE END OF THE CURVE.
2. INSTALL ALL DELINEATORS AT EDGE OF THE ROADWAY PERPENDICULAR TO THE ONCOMING TRAFFIC.
3. SEE TABLE1 FOR VALUE OF 'S' i.e. SPACING OF DELINEATORS ON THE CURVE.
4. ON TANGENT SECTION OF ROADWAY DELINEATORS TO BE PLACED UNIFORMLY AT INTERVALS OF 50M. AT PROBLEM LOCATIONS SUCH AS CAUSEWAYS DELINEATOR SPACING TO BE REDUCED TO 10M.

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE SPECIFIED.

FIG–19

DELINEATOR LAYOUT

DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.

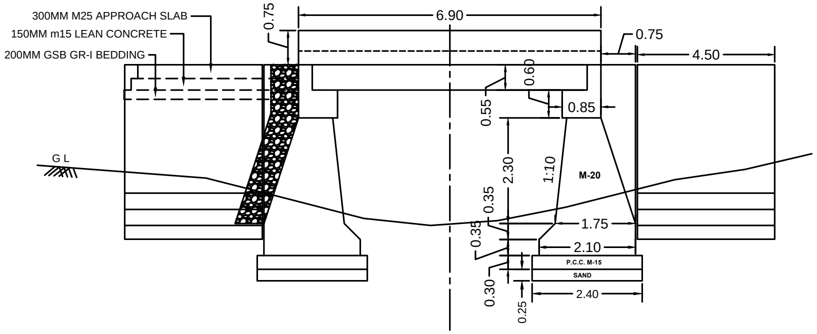
SAVARKUNDLA - DHASA ROAD SH - 236 & SH - 021
SCHEDULE

RUMBLE SRIPS			
Sr. No	Location Km Chainage	Nos	Remarks
	SH - 236		
1	1+010	2	Nr Settlement
2	5+750	2	Curveture
3	10+600	2	Village (Bhuva)
4	12+300	2	Curveture
5	26+850	2	Village (Sanalia)
6	27+800	2	Curveture
7	28+500	2	Curveture
8	32+650	2	Village (Khara) & Cross road of T-junction
9	37+400	2	Village (Gundran)
10	40+000	2	Curveture
11	40+300	2	Village (Eklera)
12	43+450	2	Both side of Raised Pedstrain Crossing (Village Ingorala & School)
13	47+300	2	Village (Hawtad)
14	48+600	2	Curveture
15	49+340	2	Village (Damnagar)
	SH - 021		
1	3+000	2	Nr Settlement
2	5+100	2	Village (Navagam)
3	9+700	2	Village (Dahithara)
4	12+200	2+2	Damnahar Nr 4-arm junction
	Note : Also at all side roads rumbler is proposed (Total 10 side roads)		

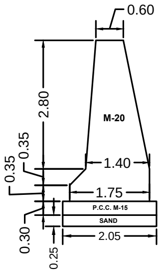
RAISED PEDESTRIAN CROSSING			
Sr. No	Location Km Chainage	Nos	Remarks
	SH - 236		
1	10+600	2	Village (Bhuva)
2	26+850	2	Village (Sanalia)
3	32+650	2	Village (Khara)
4	37+400	2	Village (Gundran)
5	40+300	2	Village (Eklera)
6	43+450	2	Village (Ingorala)
7	47+300	2	Village (Hawtad)
	SH - 021		
1	5+100	2	Village (Navagam)
2	9+700	2	Village (Dahithara)

CRASH BARRIER			
Sr. No	Location Km Chainage	Length in RMT	Remarks
1	Nr 5+700	50	RHS & LHS
2	27+200 to 27+275	75	LHS
3	27+275 to 27+375	100	RHS & LHS
4	27+500	4x30	At all four ends of MJBR
5	32+117	55	RHS & LHS

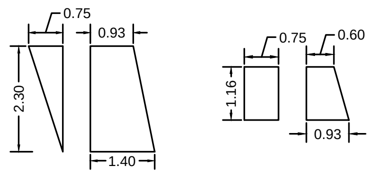
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



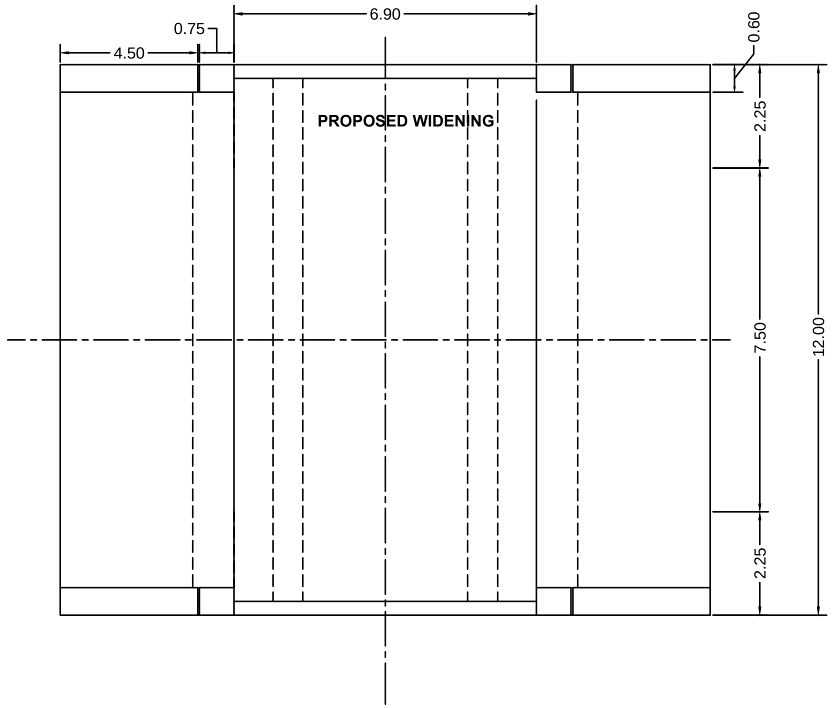
SECTION



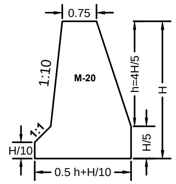
SQUARE RETURN



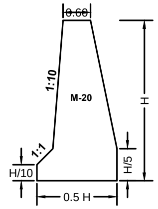
RIDING RETURN



PLAN



TYPICAL C/S OF ABUTMENT

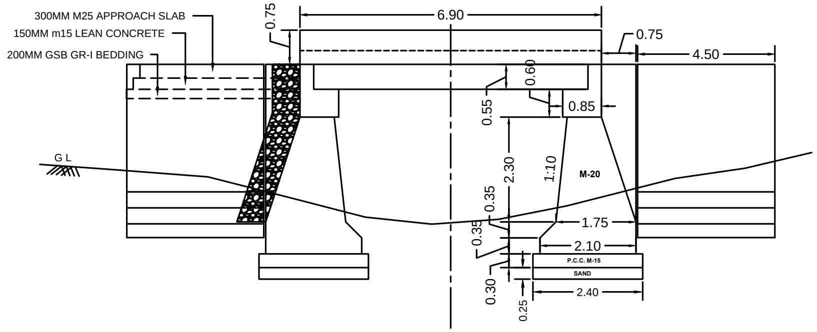


TYPICAL C/S OF SQUARE RETURN

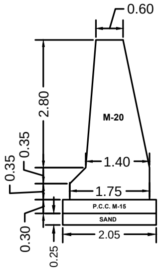
REF :
FOR REINFORCEMENT & OTHER DETAILS REFER STANDARD PLAN FOR HIGHWAY BRIDGES WIT R CC SLAB TYPE SUPER STRUCTURE VOL- II, ISSUED BY MINISTRY OF SURFACE TRANSPORT (ROAD WING) NEW DELHI.

TYPICAL RECONSTRUCTION OF SLAB DRAIN (6.00 Mt. SPAN)

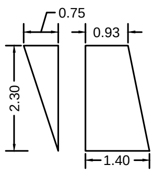
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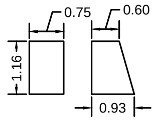
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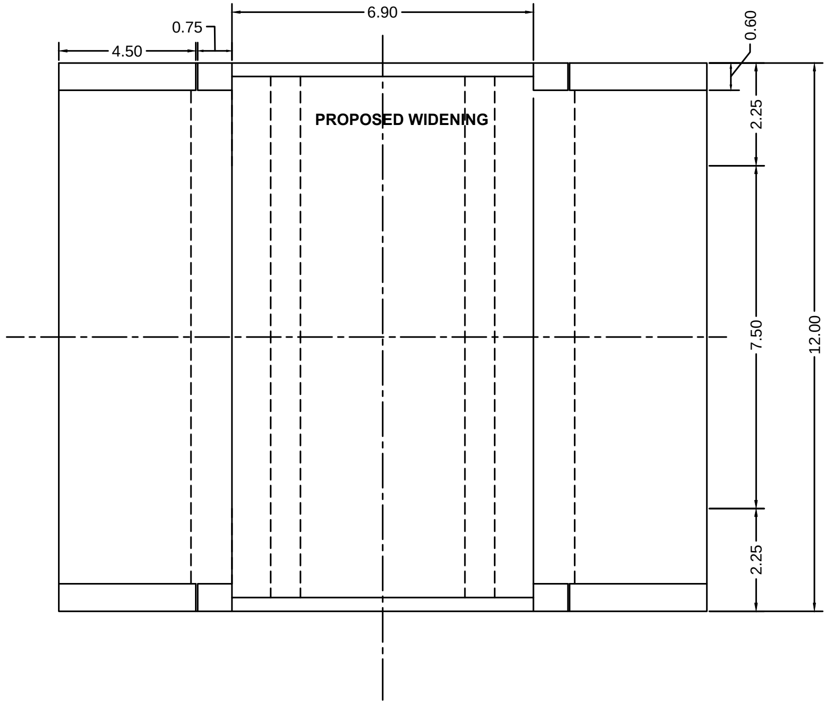


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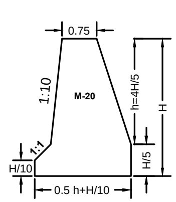


RIDING RETURN

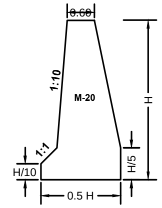




PLAN



TYPICAL C/S OF ABUTMENT

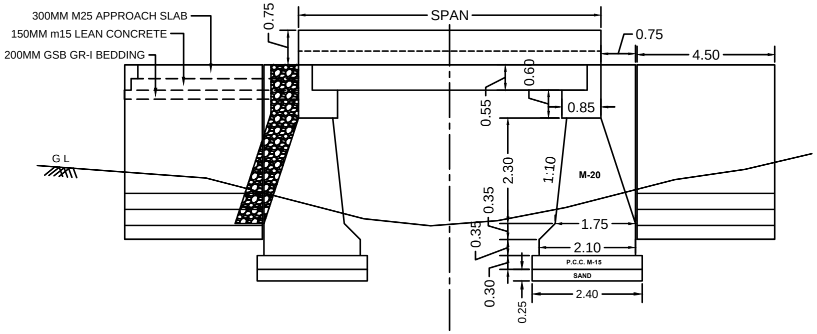


TYPICAL C/S OF SQUARE RETURN

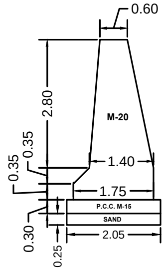
REF :
FOR REINFORCEMENT & OTHER DETAILS REFER STANDARD PLAN FOR HIGHWAY BRIDGES WIT R CC SLAB TYPE SUPER STRUCTURE VOL- II, ISSUED BY MINISTRY OF SURFACE TRANSPORT (ROAD WING) NEW DELHI.

TYPICAL RECONSTRUCTION OF SLAB DRAIN (6.00 Mt. SPAN)

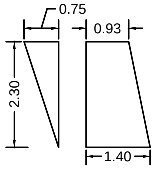
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



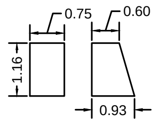
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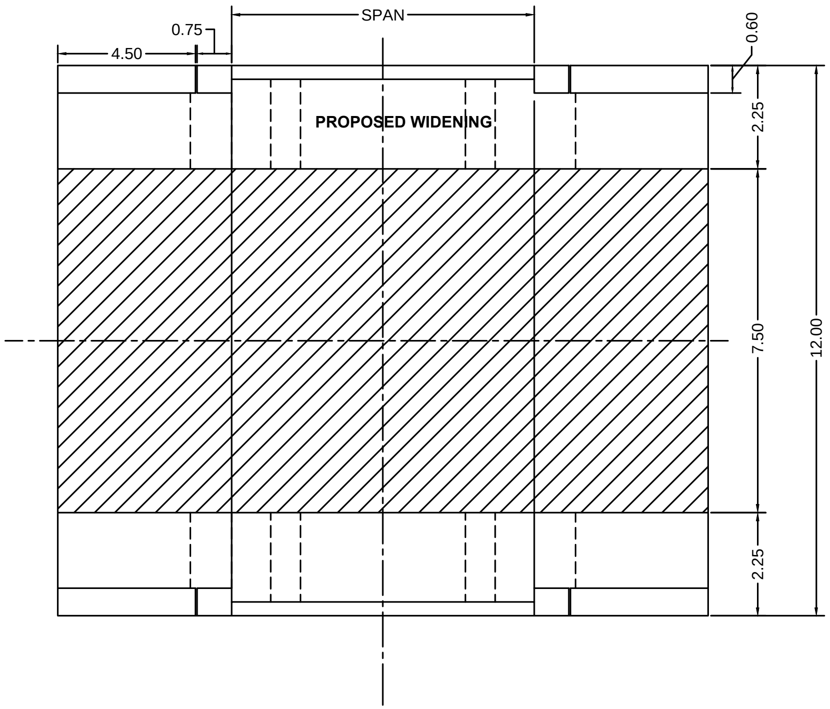


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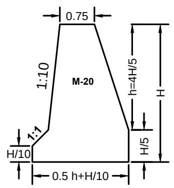


RIDING RETURN

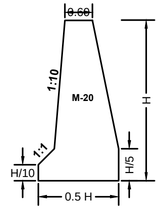




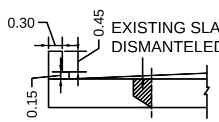
PLAN



TYPICAL C/S OF ABUTMENT



TYPICAL C/S OF SQUARE RETURN

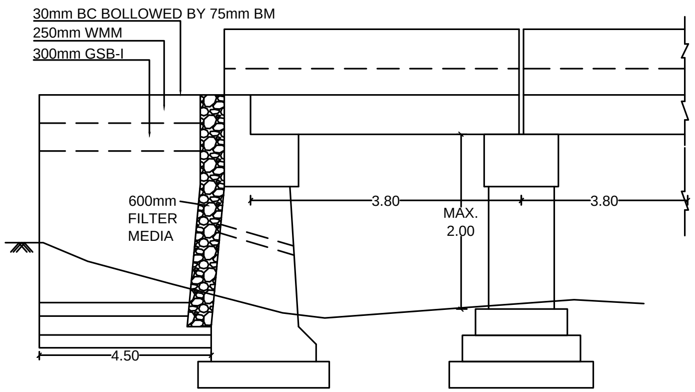


SECTION - XX

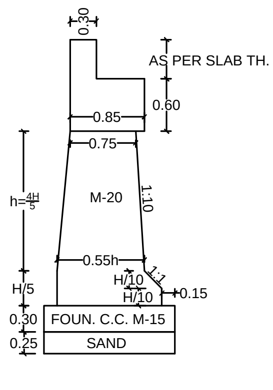
REF :
FOR REINFORCEMENT & OTHER DETAILS REFER STANDARD PLAN FOR HIGHWAY BRIDGES WIT R CC SLAB TYPE SUPER STRUCTURE VOL- II, ISSUED BY MINISTRY OF SURFACE TRANSPORT (ROAD WING) NEW DELHI.

TYPICAL WIDENING OF SLAB DRAIN (6.00 Mt. SPAN)

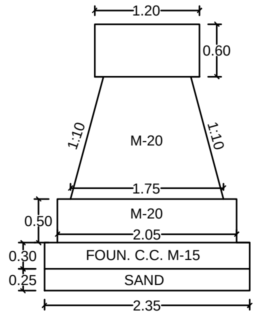
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



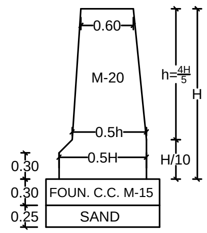
TYPICAL SECTIONAL ELEVATION



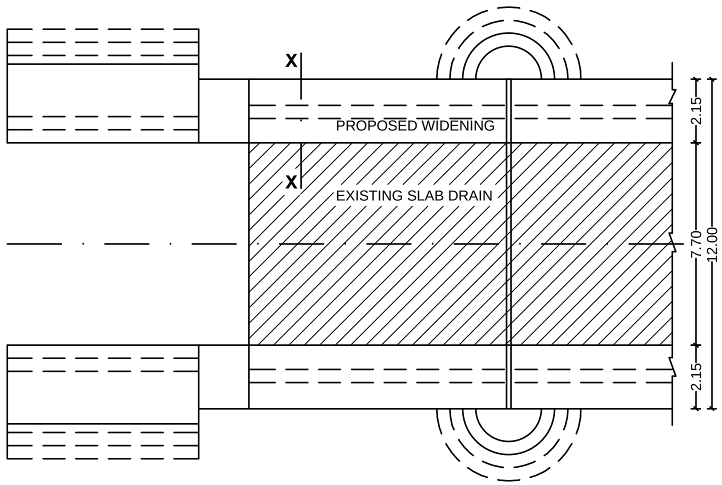
TYPICAL SECTION OF ABUTMENT



TYPICAL SECTION OF PIER



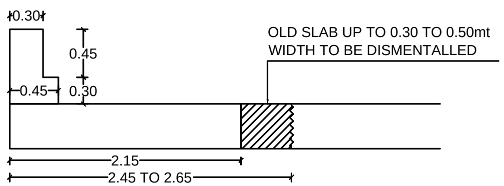
TYPICAL SECTION OF SQUARE RETURN



TYPICAL PLAN

REFERENCE :-

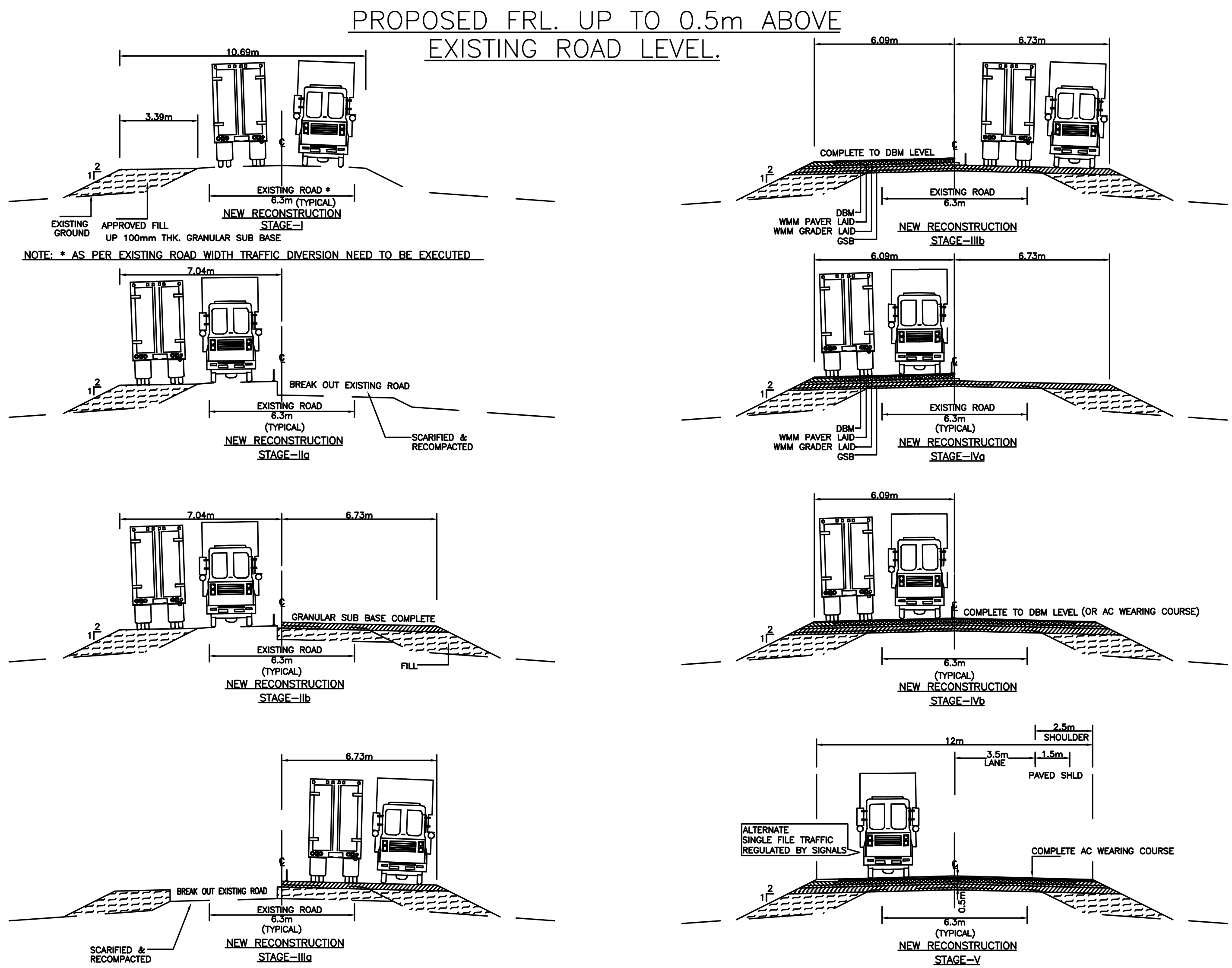
1. FOR RAINFORCEMENT & OTHER DETAILS REFFER STANDERD PLAN FOR HIGHWAY BRIDGES WITH R.C.C. SLAB TYPE SUPER STRUCTURE VOL. - II , ISSUED BY MINISTRY OF SURFACE TRANSPORT(ROAD WING) NEW DELHI.
2. FOR SECTION OF ABUTMENT & RETURN STANDARD SECTION AS PER S.V. NATU'S CIRCULAR (STATE SOR) SHALL FOLLOW.



SECTION X-X

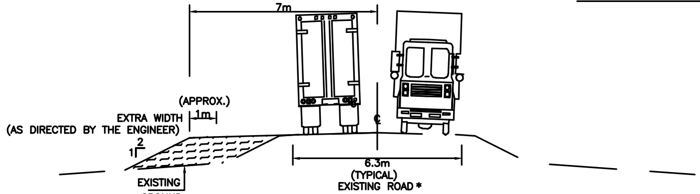
TYPICAL DRG. OF WIDENING OF SLAB CULVERTS (C/C SPAN 3.80mt & HEIGHT FROM G.L. UP TO 2.00mt)

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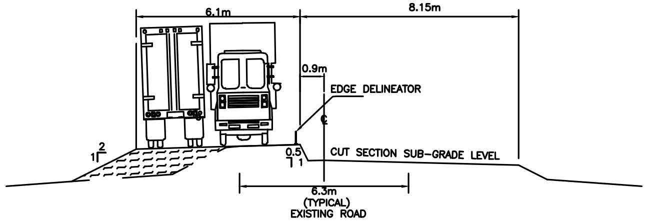
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.

PROPOSED FRL. AT APPROXIMATELY THE SAME LEVEL AS EXISTING ROAD LEVEL.

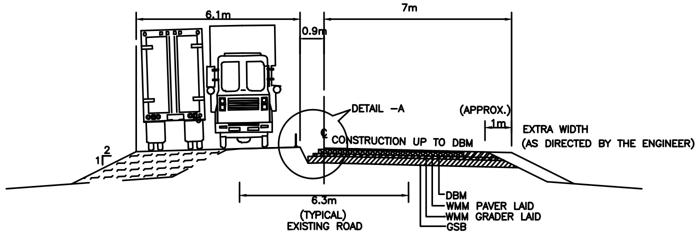


NEW RECONSTRUCTION
STAGE-I

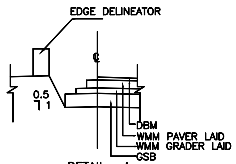
NOTE: * AS PER EXISTING ROAD WIDTH TRAFFIC DIVERSION NEED TO BE EXECUTED



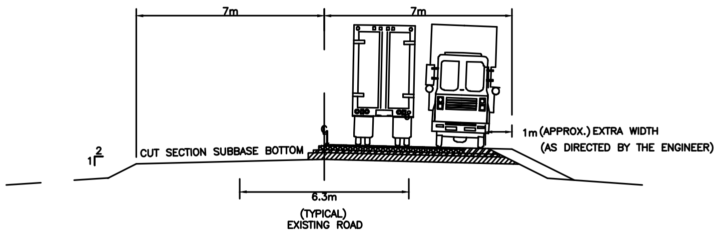
NEW RECONSTRUCTION
STAGE-IIa



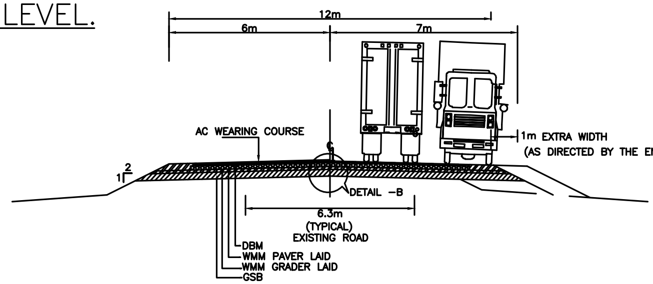
NEW RECONSTRUCTION
STAGE-IIb



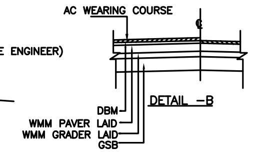
DETAIL -A



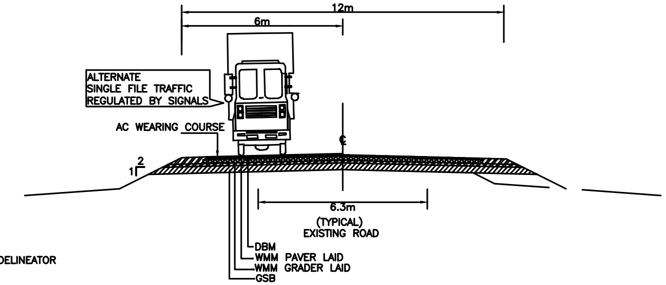
NEW RECONSTRUCTION
STAGE-IIIa



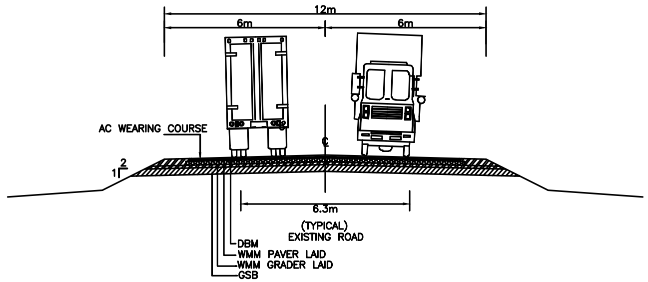
NEW RECONSTRUCTION
STAGE-IIIb



DETAIL -B



NEW RECONSTRUCTION
STAGE-IVa



NEW RECONSTRUCTION
STAGE-IVb

DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.

Traffic Management requirements and construction methodology

Contractor's Submission

The Contractor shall submit, for the Engineer's approval, Traffic Management Plans and associated method statements at least 5 working days prior to commencement of the works. The Traffic Management Plans and method statements shall include the following minimum information and details:

- Proposed location and sequence of sub-sections for construction.
- Proposed staging of "half-width" by "half-width" road construction and traffic safety and control.
- Details of transitions to maintain safe traffic flow between various road construction zones.
- Details of temporary diversions in accordance with Specification Clause 112.3.
- Typical details of arrangements for construction under traffic including details of traffic arrangements after the cessation of work each day.

Special consideration shall be given in the Traffic Management Plans to the safety of pedestrians and workers, both by day and at night.

Temporary diversions will be constructed only with the approval of the Engineer.

In general the contractor must plan his works in consideration of the following basic principles:

1. Partial pavement construction over long lengths shall not be permitted. The contractor should concentrate his activities over sections such that he can complete continuous fronts of up to a maximum of say 10km before starting the adjacent front. (10km is taken as a reasonable guide.) The contractor may open more than one continuous 10km front provided that he has the separate resources to do so. The resources working on a 10km front may not be shifted to next front until no longer required on previous front. It is acknowledged that as one front nears completion plant will become available to work on a successive front. This implies some inevitable overlap between one front and its successor, which is acceptable.
2. For road widening operations, excavation adjacent to the existing road shall not be permitted on both sides simultaneously. Earthworks must be completed to the level of the existing road before excavation work on the opposite side will be permitted.
3. The construction operations taking place on a particular front must be managed efficiently such that delays between successive pavement layers are minimized.
4. Before the start of the monsoon season (June) the contractor shall ensure that the pavement over all the fronts is complete, full width, at least to DBM level, but preferably with AC wearing course. The contractor should not start any sections of pavement that he cannot complete before the start of the monsoon season.
5. In the absence of permanent facilities, temporary drainage and erosion control measures, as required by the Specifications, are to be implemented prior to the onset of the monsoon.
6. Each project road has its own unique conditions and therefore the above traffic management concept should be modified to suit, but respecting the basic principle of completion of discrete sections.
7. Works on CD structures requiring diversions should be sequenced in with the overall traffic management plan, but can be treated independently of the established 10km working fronts where separate resources are available.
8. When separate traffic diversions are required for CD works and other situations that demand them the minimum requirements of Spec Cl 112.3 of MORTH should be equaled or bettered. Such diversions should have smooth connections to the road with well-established and clear signage to give all required information to the road user. Such diversions should be maintained throughout their required duration.
9. In general traffic management and safety measures implemented should be inspected regularly by the contractor and the engineer (day and night) to rectify problems before giving cause for complaint.
10. The Employer is highly concerned about the quality of traffic management and safety as an integral part of the project and will not compromise on these aspects at any stage.

Separate traffic diversions as per Spec. Cl. 112.3 of MORTH shall in general be required for the following construction situations as determined by the Engineer:

- For CD reconstruction
- For CD widening if considered necessary by the Engineer
- For new roadworks when the FRL is substantially above existing RL
- For new roadworks when the FRL is substantially below the existing RL such that a separate diversion is required in the judgment of the engineer

The above criteria may be adjusted as decided by the Engineer if alternative methodology is possible and cost-effective as per actual site conditions. The above criteria may also be adjusted when the design centerline is significantly offset with respect to the existing.

In cases where separate traffic diversions are not essential or cost effective the construction methodology should be in accordance with the following guidelines :

The contractor working on a 10km section, the pavement construction (except new alignments) should be limited to 500m sub-sections with a minimum of 1 to1.5 km between successive sub-sections to ease traffic management and safety issues. The earthworks in the widening portions are not limited in this respect. Excavation on both sides of the existing road over the same sub-section simultaneously shall not be permitted for reasons of safety to the traffic, particularly at night. Sub-sections longer than 500m may be authorized by the Engineer if two-way traffic flow can be comfortably managed and the Contractor should maintain dust control, proper road edge delineation, proper signage and traffic control. The number of sub-sections open for construction shall suit the contractor's needs to meet his approved clause 14 Programme.

Where single file traffic is permitted (only applicable to final wearing course operations), the sub-sections shall be reduced to a maximum length whereby safe traffic regulation can be physically managed. Single file traffic may not be permitted at certain locations or times of the day when traffic volumes are such that excessive congestion shall occur.

Three typical traffic management scenarios for which separate traffic diversions are not required are illustrated on the attached drawings and described as follows:

Case 1: Proposed FRL at Approximately the same level as the existing RL (Refer to drawing TM-03)

Stage I

- Traffic running normally on the existing road.
- Construct the earthworks on one side only with proper benching into the existing embankment as appropriate. Temporary additional widening by approximately 1.0 to 1.25m,as directed by the engineer.
- Construct temporary overfilling to match the level of the adjacent existing pavement.
- Install proper edge delineation and temporary road signs to suit next stage.

Stage II

- Divert traffic on new partial construction and half width of existing road. Earth running surface to be kept watered periodically to control dust.
- Breakout half width of the existing road on the other side. Reuse salvaged materials elsewhere or dispose as appropriate.
- Prepare cut formation as per Spec Cl 301.6 of MORTH or as otherwise directed by the Engineer.
- Construct earthworks to the design levels including the use of salvaged materials from the existing road where possible.
- Construct GSB, WMM layers and DBM to the design levels.
- DBM complete to half width. Adjust temporary delineation and signs ready for next stage.

Stage III

- Divert traffic onto the new DBM and work on the other side.
- Scarify temporary earthworks and break out remaining portion of the existing road (savage materials for reuse in earthworks of adjacent section.)
- Prepare cut formation as per Spec Cl 301.6 of MORTH.
- Construct earthworks to the design levels including use of salvaged materials from the existing road where possible.
- Construct GSB and WMM layers to the design levels.
- Construct DBM complete half width (full width now complete)
- Construct AC wearing course complete half width
- Adjust temporary delineation and signs ready for next stage.

Stage IV

- Regulate traffic to single file flow properly controlled by signalmen while the AC wearing course is completed on the other side to complete the full width.
- Shoulders and side slopes made good and finished during this stage.
- This stage with single file traffic flow should be limited to the shortest duration possible to minimize disruption to traffic flow.

(The Engineer may allow the full road width to be open for traffic after completion of DBM (Stage III) provided that wearing course operations follow without undue delay.)

Move to the next 500m and repeat the process. The bituminous paving works should be planned in conjunction with the staging of the road base works to give a continuity of operations in accordance with the contractor's materials production and paving rate. The bituminous paving works must take place as soon as practicable

During paving operations short stretches of alternating single file traffic may be permitted during off-peak times. Traffic control for single file traffic must meet the approval of the Engineer and be diligently controlled throughout its implementation.

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Case 2: Proposed FRL up to 0.5m above the existing RL(Refer to drawing TM-04)

Stage I

• Traffic running normally on the existing road.
• Construct the earthworks on one side only with proper benching into the existing embankment as appropriate. Finish to match level of the existing road.
• Install proper edge delineation and temporary road signs to suit next stage.

Stage II
• Divert traffic on new partial construction and half width of existing road. Earth running surface to be kept watered periodically to control dust.
• Breakout half width of the existing road on the other side. Reuse salvaged materials elsewhere or dispose as appropriate.
• Prepare cut formation as per Spec Cl 301.6 of MORTH. or as otherwise directed by the Engineer.
• Construct earthworks to the design levels including the use of salvaged materials from the existing road where possible.
• Construct GSB to the design levels.
• Adjust temporary delineation and signs ready for next stage.

Stage III
• Divert traffic onto the new GSB and work on the other side.
• Break out remaining portion of the existing road (savage materials for reuse in earthworks of adjacent section.) and trim adjacent earthworks to the required level.
• Prepare cut formation as per Spec Cl 301.6 of MORTH.
• Construct earthworks to the design levels including use of salvaged materials from the existing road where possible.
• Construct GSB and WMM layers to the design levels.
• Construct DBM complete half width. (or AC if approved by The Engineer)
• Adjust temporary delineation and signs ready for next stage.

Stage IV
• Divert traffic onto the new DBM and work on the other side.
• Prepare surface of GSB, repair any traffic damage.
• Construct WMM and DBM. (DBM now complete to full width.)

Stage V
• Regulate traffic to single file flow properly controlled by signalmen while the AC wearing course is completed on each side to complete the full width.
• Shoulders and side slopes made good and finished during this stage.
• This stage with single file traffic flow should be limited to the shortest duration possible to minimize disruption to traffic flow.

Case 3: Proposed FRL 0.5m to >1m above the existing RL(Refer to drawing TM-05)

Stage I

• Traffic running normally on the existing road.
• Construct the earthworks on one side only with proper benching into the existing embankment as appropriate. Finish to match level of the existing road.
• Install proper edge delineation and temporary road signs to suit next stage.

Stage II
• Divert traffic on new partial construction and half width of existing road. Earth running surface to be kept watered periodically to control dust.
• Breakout half width of the existing road on the other side. Reuse salvaged materials elsewhere or dispose as appropriate.
• Prepare cut formation as per Spec Cl 301.6. or as otherwise directed by the Engineer.
• Construct earthworks to the design levels including the use of salvaged materials from the existing road where possible.
• Construct GSB to the design levels.
• Protect half-width construction edge with sandbags or other approved method.
• Adjust temporary delineation and signs ready for next stage.

Stage III
• Divert traffic onto the new GSB and work on the other side.
• Break out remaining portion of the existing road (savage materials for reuse in earthworks of adjacent section.) and trim adjacent earthworks to the required level.
• Prepare cut formation as per Spec Cl 301.6 of MORTH
• Construct earthworks to the design levels including use of salvaged materials from the existing road where possible.
• Construct GSB and WMM layers to the design levels.
• Construct DBM complete half width. (or AC if approv ed by The Engineer)
• Adjust temporary delineation and signs ready for next stage.

Stage IV
• Divert traffic onto the new DBM and work on the other side.
• Construct WMM and DBM. (DBM now complete to full width.)

Stage V
• Regulate traffic to single file flow properly controlled by signal men while the AC wearing course is completed on each side to complete the full width.
• Shoulders and side slopes made good and finished during this stage.
• This stage with single file traffic flow should be limited to the shortest duration possible to minimize disruption to traffic flow.

For all the above construction scenarios there shall be a need for a considerable input into planning and implementing the different stages in a practical and safe manner. There shall correspondingly be a need for clear and explicit signage correctly positioned to give adequate warning and guidance to road users. The contractor shall pay particular attention to the control of dust during the trafficking of earthen or granular surfaces and proper delineation of the edges of the traveled way. Watering to control dust should be carried out at least three times per day. If the Contractor fails to control dust from the trafficking of earthen or granular surfaces the Engineer will instruct the Contractor to apply a temporary bituminous surface treatment at the Contractor's cost. The Contractor is responsible for maintaining and making-good any surface under trafficking to the approval of the Engineer and at no additional cost to the Employer.

The contractor may propose alternative traffic management systems provided that the concept of sectional completion and contained working sub-section are respected.

Other Traffic Management Considerations during Construction

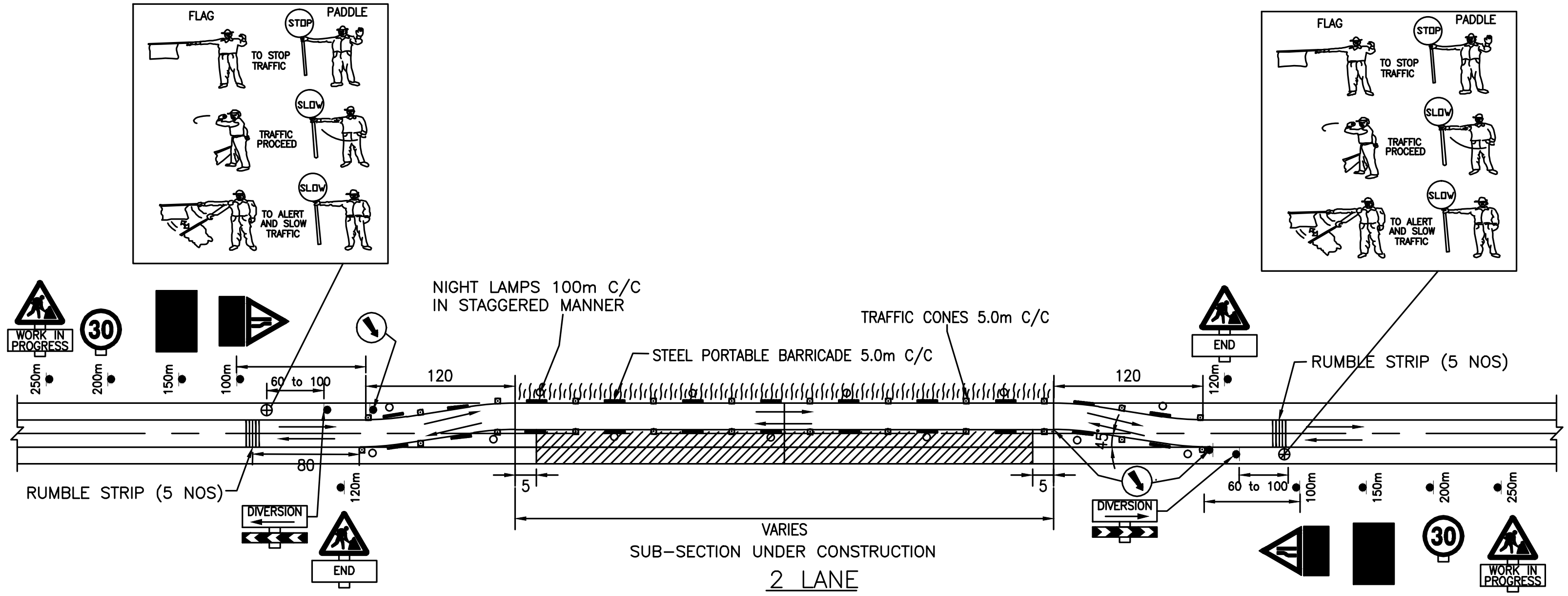
During any particular stage of traffic management, the Contractor shall make sure that adjoining properties and access roads are not cut off unless there are viable alternatives available. Where required, the Contractor shall construct and maintain temporary access respecting all necessary safety requirements.
Bus stops shall be preserved and adjusted to suit the traffic management staging with proper and safe accessibility for pedestrians.
The Contractor must train his personnel who are assigned for the purpose of traffic control and safety. These personnel must understand the importance of their role and have a proper awareness of the concept of safe traffic management. Such personnel should themselves be road users to understand safe traffic control procedures.

Safety Requirements

The importance of proper safety measures cannot be over-emphasized. It is the sole responsibility of the Contractor to implement and maintain all necessary safety measures during the course of the works. The Contractor shall adhere to the requirements of the MOST Specifications and the latest IRC codes, particularly IRC:SP:55-2001 concerning safety in road construction zones. The Engineer shall strictly monitor the Contractor's performance in the execution of his duties with respect to safety and The Engineer shall exercise his authority under the Contract to have any deficiencies remedied.

REFERENCE DRAWINGS

TYPICAL CROSS SECTIONS FOR TRAFFIC MANAGEMENT	CASE-1	DWG.NO.	TM-03
TYPICAL CROSS SECTIONS FOR TRAFFIC MANAGEMENT	CASE-2	DWG.NO.	TM-04
TYPICAL CROSS SECTIONS FOR TRAFFIC MANAGEMENT	CASE-3	DWG.NO.	TM-05
TYPICAL PLAN FOR TRAFFIC MANAGEMENT SEQUENCE DURING CONSTRUCTION		DWG.NO.	TM-06
SCHEMATIC PLAN FOR TRAFFIC MANAGEMENT BETWEEN SUB-SECTION AT DIFFERENT STAGES		DWG.NO.	TM-07
TYPICAL ARRANGEMENT OF TRAFFIC CONTROL DEVICES FOR 500M SUB-SECTION		DWG.NO.	TM-08
TYPICAL ARRANGEMENT OF TRAFFIC DIVERSION AT NEW CULVERT		DWG.NO.	TM-09



SIGN & DELINEATORS INVENTORY AT 2 LANE

SPEED LIMIT SIGN		2 NOS.
MEN AT WORK SIGN & BOARD		2 NOS.
MEN AT WORK SIGN & BOARD		2 NOS.
DIVERSION BOARD & SIGN		2 NOS.
TRAFFIC CONES		5.0m C/C
KEEP RIGHT		3 NOS.
STEEL PORTABLE BARRICADE		5.0m C/C
SINGLE FILE TRAFFIC		2 NOS.
TRAFFIC CONTROL AHED		2 NOS.

NOTES:

1. A QUALIFIED PERSONNEL AT LEAST AVERAGE INTELLIGENCE, BE MENTALLY ALERT AND GOOD IN PHYSICAL CONDITION BE SELECTED.
2. FLAGMEN SHOULD BE EQUIPPED WITH YELLOW HELMET WITH GREEN REFLECTIVE STICKER FIXED AROUND AND REFLECTIVE JACKET ALONG WITH HAND SIGNALING DEVICES SUCH AS FLAGS AND SIGN PADDLES. RED FLAGS, STOP, SLOW PADDLES AND LIGHTS ARE USED IN CONTROLLING TRAFFIC THROUGH WORK AREA.

   RED FLAG – MINIMUM SIZE 600 X 600 MM (POLYESTER CLOTH ADVISABLE) SECURELY FASTENED TO A STAFF OF LENGTH APPROX. 1 M

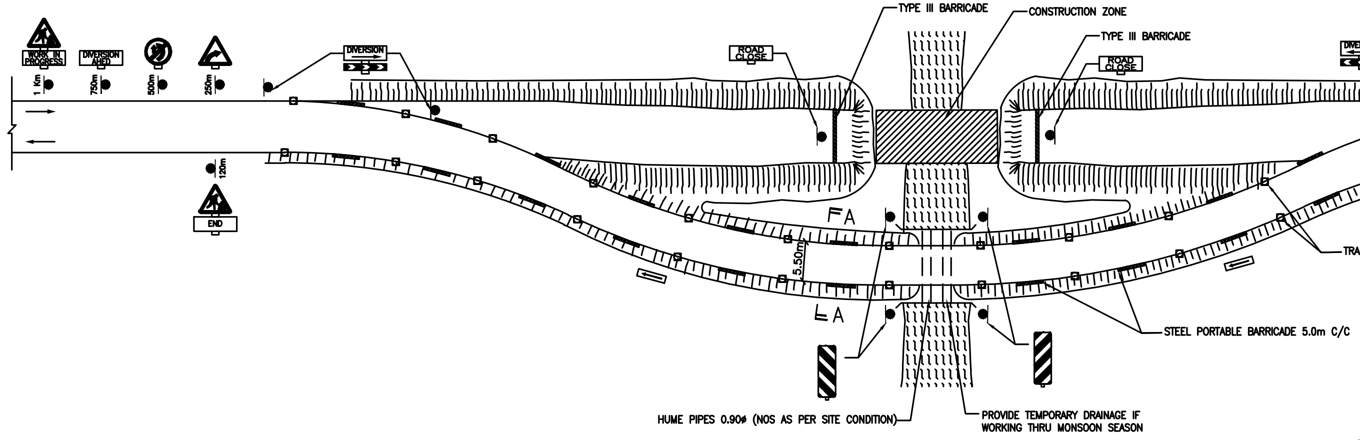
   STOP SIGN PADDLE – SHAPE – OCTAGONAL (LIGHT IN WEIGHT) WIDTH – 600 MM WITH RIGID HANDLE. BACKGROUND COLOR – RED, LETTER COLOR – WHITE

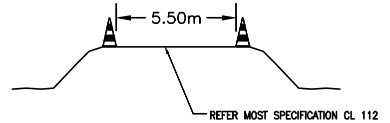
   SLOW SIGN PADDLE – SHAPE – OCTAGONAL (LIGHT IN WEIGHT) WIDTH – 600 MM WITH RIGID HANDLE. BACKGROUND COLOR – YELLOW, LETTER COLOR – BLACK, BORDER COLOR–BLACK.
3. FLAGMEN NEED TO MAINTAIN THE FLOW OF TRAFFIC CONTINUOUS PAST A WORK ZONE AT RELATIVELY REDUCED SPEEDS BY SUITABLY REGULATING THE TRAFFIC. HE SHALL STOP THE TRAFFIC FOR A SHORT WHILE WHENEVER REQUIRED (E.G. FOR ENTRY AND EXIT OF CONSTRUCTION EQUIPMENT IN TO WORK ZONE).
4. FLAGMAN SHOULD BE POSITIONED IN A PLACE WHERE HE IS CLEARLY VISIBLE TO APPROACHING TRAFFIC AND AT A SUFFICIENT DISTANCE TO ENABLE THE DRIVERS TO RESPOND FOR HIS FLAGGING INSTRUCTIONS. A FLAGMAN NEVER LEAVES HIS POST UNTIL PROPERLY RELIEVED,
5. THE STANDARD DISTANCE SHALL BE MAINTAINED AT 60 – 100 M BUT CAN BE ALTERED DEPENDING UPON THE APPROACH SPEED AND SITE CONDITIONS. IN URBAN AREAS THIS DISTANCE SHALL BE TAKEN AS 20 M TO 50 M.
6. STANDARD SIGNALS TO BE GIVEN BY FLAG MEN AND THEY SHOULD UNDERGO SPECIAL TASK TRAINING PROGRAM.
7. USE TRAFFIC LED FLASH LIGHTS AT NIGHT INSTEAD OF FLAGS.

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN METER. UNLESS OTHERWISE SPECIFIED
2. CONTRACTOR SHALL SUBMIT DIVERSION PLAN FOR ENGINEER'S APPROVAL PRIOR TO CONSTRUCTION.
3. CONTRACTOR SHALL MAINTAIN DIVERSION THROUGHOUT TILL THE CONSTRUCTION IS COMPLETE.
4. CONTRACTOR IS RESPONSIBLE FOR THE SECURITY OF THE SIGNS AND DELINEATORS.
5. PROVIDING BARRICADING/CAUTION TAPES OF HIGH QUALITY PVC TAPE TUBE TYPE TO ENCLOSE CONSTRUCTION AREA.
6. TYPE OF RUMBLE STRIP WILL DEPEND ON ROAD SURFACE(IF SURFACE IS BLACK TOP–BITUMEN, IF GSB–GSB)
7. USE TWO ROWS OF ROPE LED LIGHTING WITHIN CONSTRUCTION ZONE DURING NIGHT ON BOTH EDGES OF MOTORABLE CARRIAGEWAY.

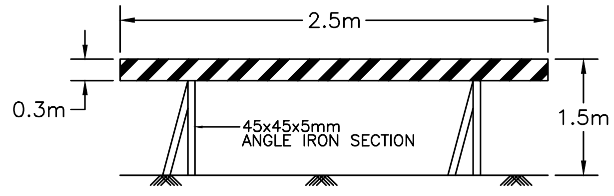
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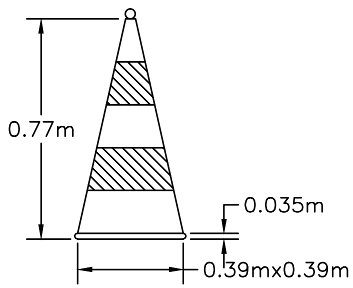


SIGN & DELINEATORS INVENTORY

MEN AT WORK SIGN & BOARD	2 NOS.
MEN AT WORK SIGN & BOARD	2 NOS.
DIVERSION BOARD	2 NOS.
OVERTAKING PROHIBITED SIGN	2 NOS.
CURVE SIGN	2 NOS.
DIVERSION BOARD & SIGN	2 NOS.
ROAD CLOSED BOARD	2 NOS.
TYPE III BARRICADE (AS PER IRC:SP:55–2001)	2 NOS.
HAZARD MARKER	4 NOS.
TRAFFIC CONES	5.0m C/C
STEEL PORTABLE BARRICADE	5.0m C/C



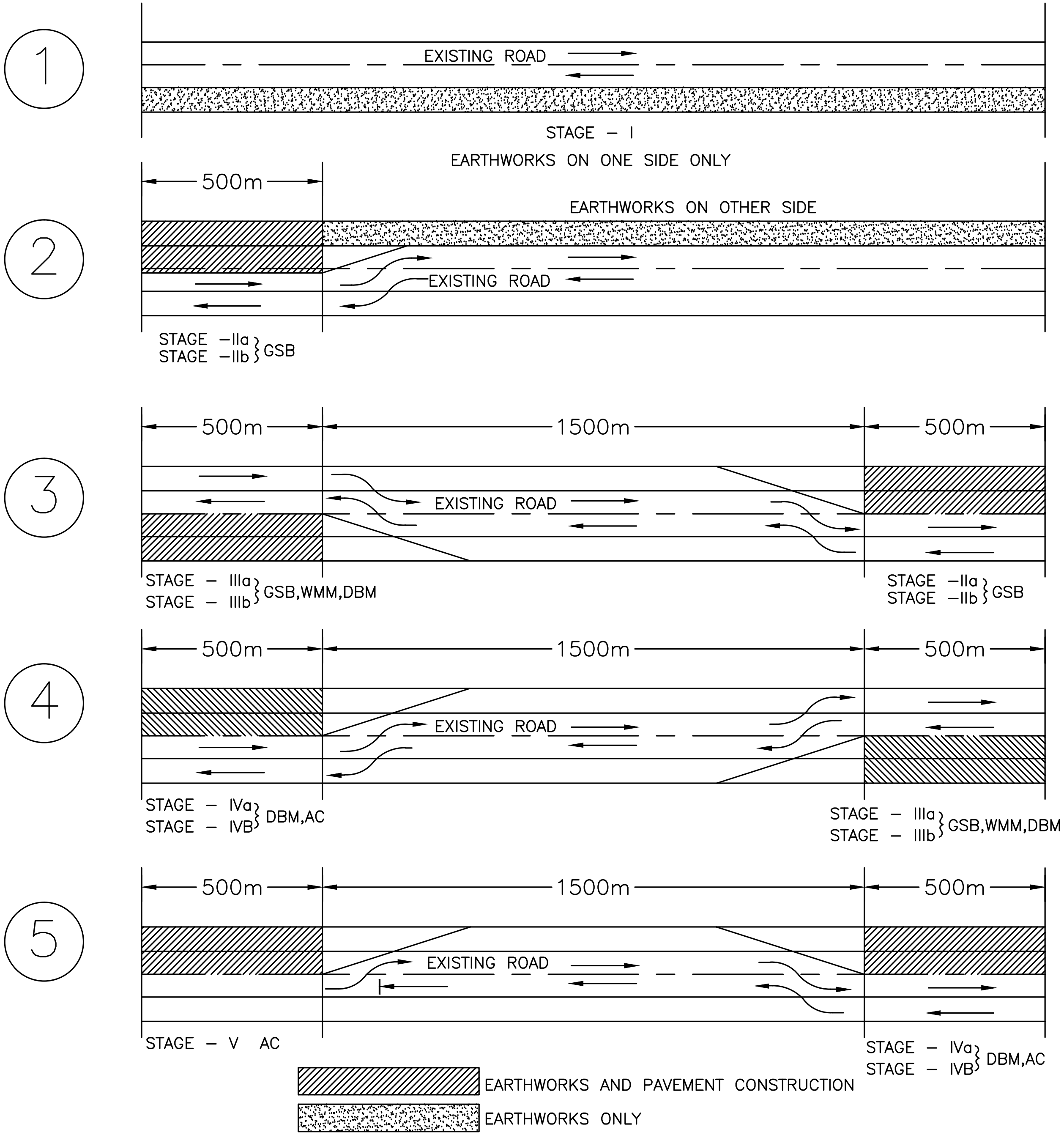
STEEL PORTABLE BARRICADE



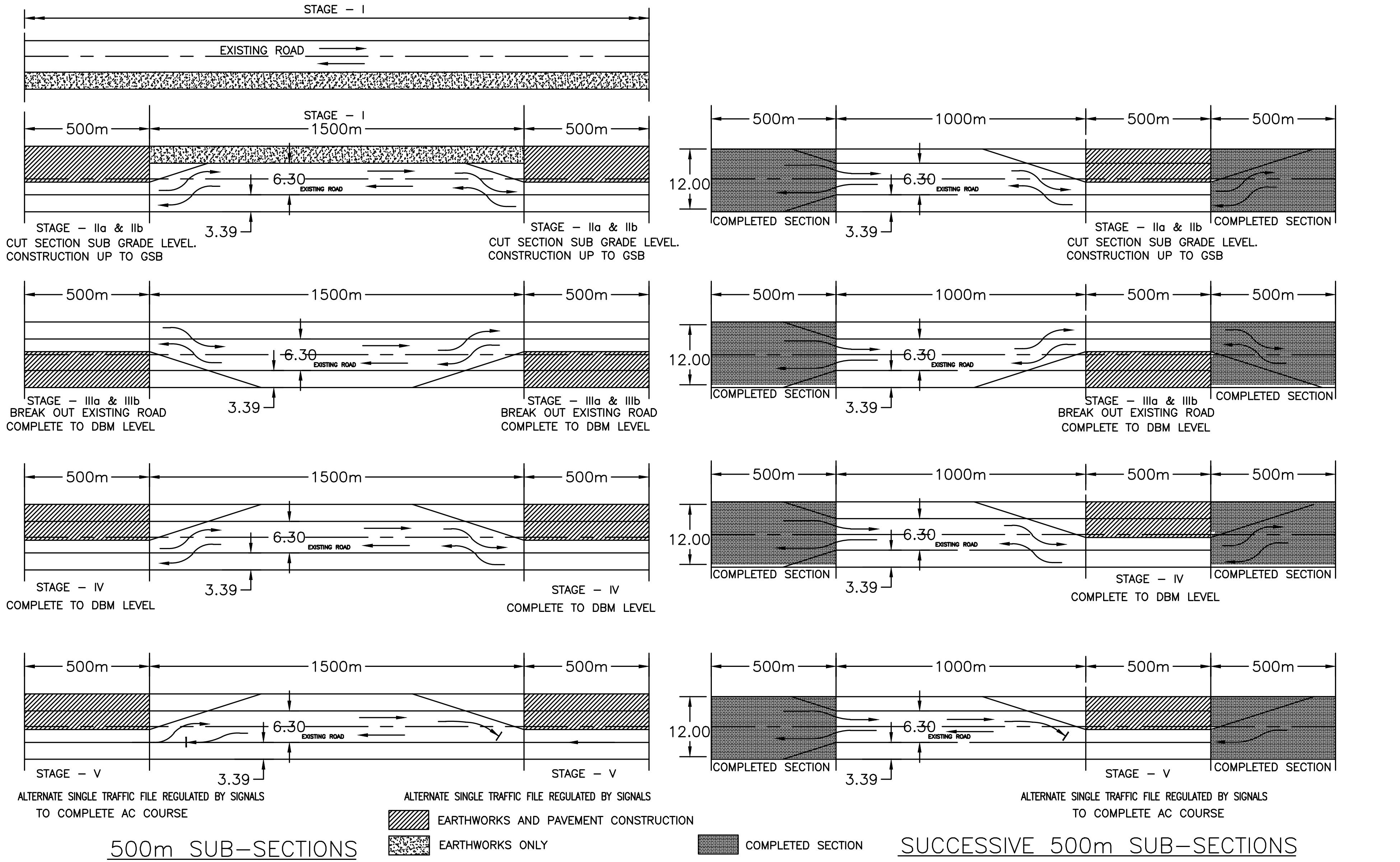
TRAFFIC CONE

NOTES:
1. ALL DIMENSIONS ARE IN METER. UNLESS OTHERWISE SPECIFIED
2. CONTRACTOR SHALL SUBMIT DIVERSION PLAN FOR ENGINEER'S APPROVAL PRIOR TO CONSTRUCTION.
3. CONTRACTOR SHALL MAINTAIN DIVERSION THROUGHOUT TILL THE CONSTRUCTION IS COMPLETE.
4. CONTRACTOR IS RESPONSIBLE FOR THE SECURITY OF THE SIGNS AND DELINEATORS.
5. PROVIDING BARRICADING/CAUTION TAPES OF HIGH QUALITY PVC TAPE TUBE TYPE TO ENCLOSE CONSTRUCTION AREA.
6. USE TWO ROWS OF ROPE LED LIGHTING WITHIN CONSTRUCTION ZONE DURING NIGHT ON BOTH EDGES OF MOTORABLE CARRIAGEWAY.

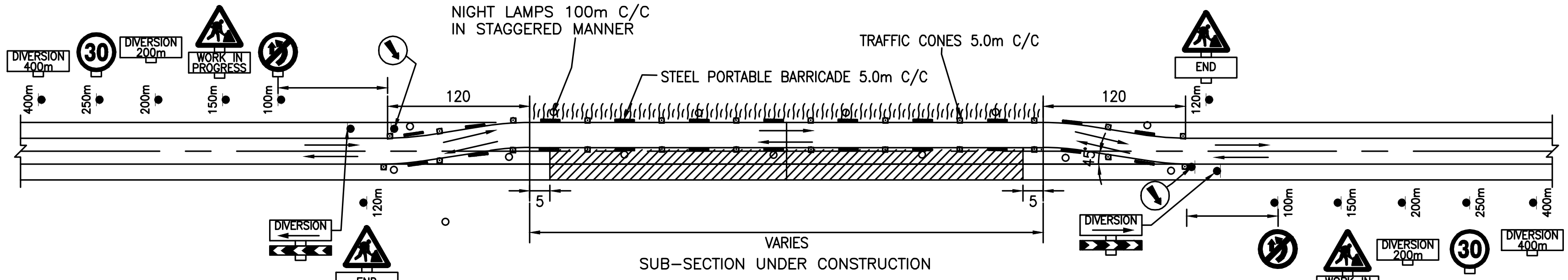
DEPUTY EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	EXECUTIVE ENGINEER STATE ROAD PROJECT DIVISION RAJKOT	SCALE : NOT TO SCALE	STATE ROAD PROJECT DIVISION RAJKOT	GOVERNMENT OF GUJARAT ROADS AND BUILDINGS DEPARTMENT SAVARKUNDLA – DHASA ROAD SH 021 & 236 ROAD MAINTENANCE PROGRAMME DATE: PROJECT: DWG No: REV.



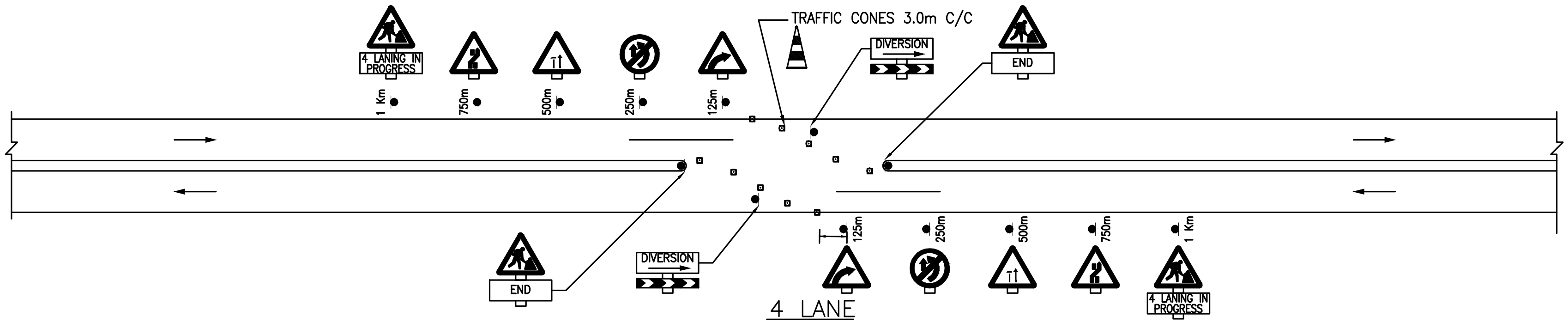
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2 LANE



4 LANE

SIGN & DELINEATORS INVENTORY AT 2 LANE

DIVERSION BOARD (400m)	2 NOS.
SPEED LIMIT SIGN	2 NOS.
MEN AT WORK SIGN & BOARD	2 NOS.
MEN AT WORK SIGN & BOARD	2 NOS.
DIVERSION BOARD (200m)	2 NOS.
OVERTAKING PROHIBITED SIGN	2 NOS.
DIVERSION BOARD & SIGN	2 NOS.
TRAFFIC CONES	5.0m C/C
KEEP RIGHT	2 NOS.
STEEL PORTABLE BARRICADE	5.0m C/C

SIGN & DELINEATORS INVENTORY AT 4 LANE

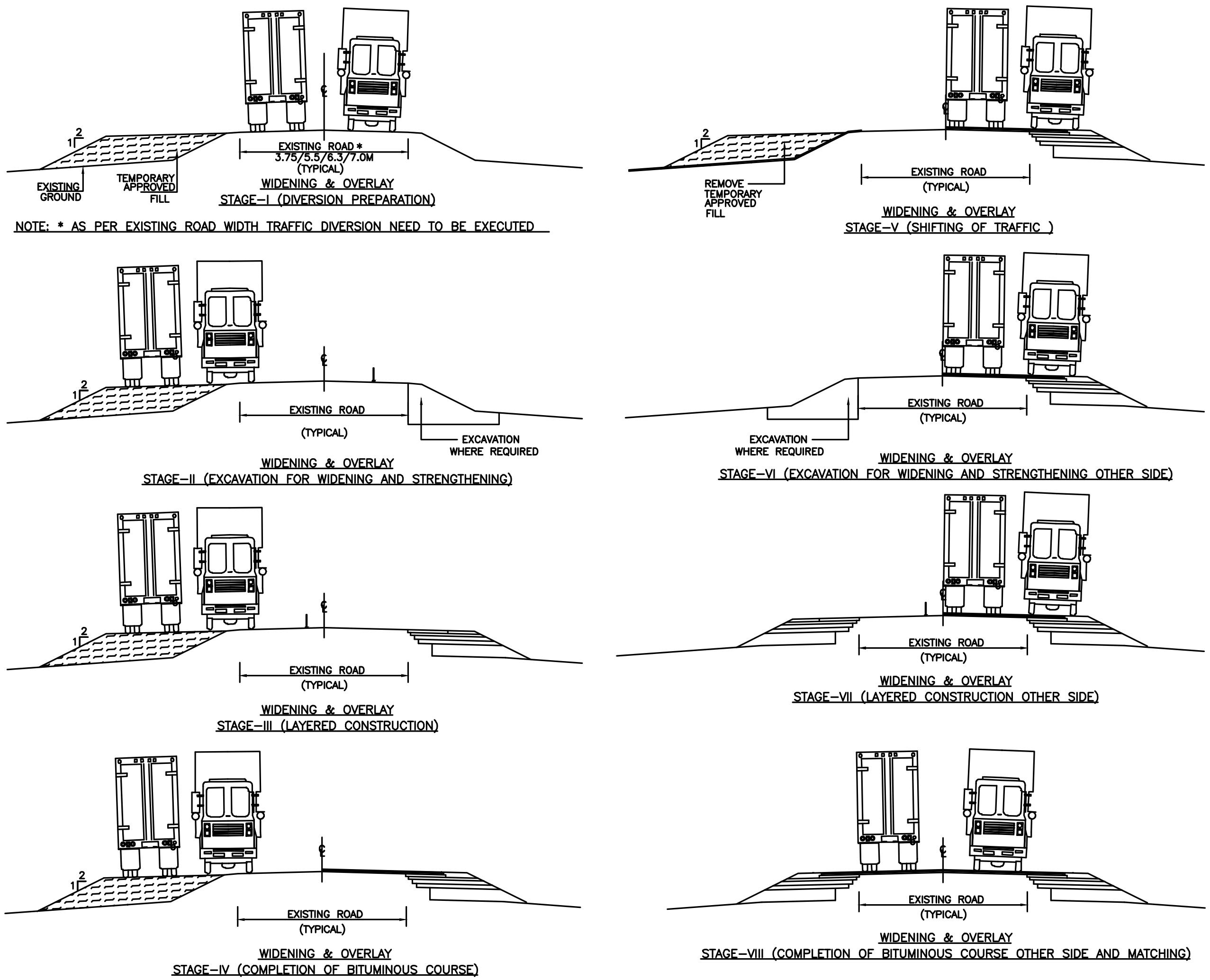
MEN AT WORK SIGN & BOARD	2 NOS.
MEN AT WORK SIGN & BOARD	2 NOS.
DIVERSION TO OTHER CARRIAGEWAY SIGN	2 NOS.
LANE CLOSED SIGN	2 NOS.
OVERTAKING PROHIBITED SIGN	2 NOS.
CURVE SIGN	2 NOS.
DIVERSION BOARD & SIGN	2 NOS.
TRAFFIC CONES	3.0m C/C

NOTES:

1. ALL DIMENSIONS ARE IN METER. UNLESS OTHERWISE SPECIFIED
2. CONTRACTOR SHALL SUBMIT DIVERSION PLAN FOR ENGINEER'S APPROVAL PRIOR TO CONSTRUCTION.
3. CONTRACTOR SHALL MAINTAIN DIVERSION THROUGHOUT TILL THE CONSTRUCTION IS COMPLETE.
4. CONTRACTOR IS RESPONSIBLE FOR THE SECURITY OF THE SIGNS AND DELINEATORS.
5. PROVIDING BARRICADING/CAUTION TAPES OF HIGH QUALITY PVC TAPE TUBE TYPE TO ENCLOSE CONSTRUCTION AREA.
6. USE TWO ROWS OF ROPE LED LIGHTING WITHIN CONSTRUCTION ZONE DURING NIGHT ON BOTH EDGES OF MOTORABLE CARRIAGEWAY.

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OVERLAY ON EXISTING ROAD



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